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Just Two Packages Get Top Billing In Datapro Poll Of Software Users

Complete Charts of User Ratings On Pages 45 and 46

By Paul Gillin
CW Staff

DELRAN, N.J. — Are software packages getting worse or are users just getting pickier? While Datapro Research Corp.'s 1983 "User Ratings of Proprietary Software" does not address that question, the survey does indicate that the period of unqualified user satisfaction that many packages have enjoyed in previous years may be at an end.

Continuing a trend begun in the 1982 survey, only two packages — IBM's Mapics manufacturing software and 1040 Software, Inc.'s Software 1040 tax administration package — made Datapro's top-rated group. Just two years ago, 19 packages received that honor.

The survey results also showed that overall expenditures on software packages have fallen dramatically in 1983. Of the more than 1,400 respondents who estimated their software expenditures, the average user spent $56,808 on packaged software in 1983 compared to $71,241 in 1982. However, users expect the average nearly to double in 1984 to more than $110,000.

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

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NEWSPAPER

$1.50 a copy; $44/year | November 7, 1983 | Vol. XVII, No. 45

PCjr Debuts; Analysts Left Unimpressed

By David Myers
CW New York Bureau

NEW YORK — IBM's long-awaited home computer, code-named Peanut but actually dubbed PCjr, may well leave corporate users wondering what all the hubbub was about.

IBM unveiled the small computer, made for it by Los Angeles-based Teledyne, Inc., at a press conference here last week. A 64K-byte version of the machine operating from a magnetic tape cassette seils for $669, while a 128K-byte floppy diskette-based model sells for $1,269.

"We expect it will find wide application as a desktop computer. That's why we're offering it through our national accounts and national marketing divisions," an IBM spokesman said. "Our feeling is that [management information systems] managers will demand it. They'll want to see if it works."

The PCjr, which will not be available until the first quarter of next

(Continued on Page 6)

Inside

Continuing to push its DOS users into VM and MVS, IBM last week announced it will sell University Computing Co.'s UCC-2. **Page 2.**

• • •

Pacific Telephone and Telegraph Co. added more fiber to its diet of transmission networks. **Page 4.**

• • •

A University of California student was arrested last week for allegedly breaking into some 200 computer accounts at computer sites around the world. **Page 9.**

• • •

A decision support system that lets executives and middle managers bypass the DP department and develop their own applications has been announced by Sperry Corp. **Page 9.**

• • •

There's some good news and some bad news for technical specialists in a recent survey of the DP job market. **Page 10.**

Microcomputers and technological change may be in the minds of most DP managers, but it's the erosion of their power base that is keeping them awake nights, attendees at last week's Data Processing Management Association conference said. **Page 18.**

• • •

Automatic teller machines may be hitting the streets with a passion, but next-day electronic funds transfer systems are what will capture the hearts of most businesses and banks, a former Chase Manhattan Bank executive suggested. **Page 69.**

• • •

Shuttle diplomacy is not reserved for politicians and world leaders. IBM recently transported a number of high-level retail executives into and out of a popular island resort to smooth relations between itself and the powerful Computer Dealers and Lessors Association. **Page 95.**

• • •

Stratus Ties Its Systems To Machines From IBM

By Jim Bartimo
And Katherine Hafner
CW Staff

CHICAGO — Software linking Stratus Computer, Inc.'s fault-tolerant systems to IBM systems and a desktop microcomputer from Data General Corp. were announced here last week at the Integrated Office Technology Conference and Exposition (Intech '83).

Stratus introduced an integrated set of software products that links its Stratus/32 Continuous Processing Systems to IBM Personal Computers and also provides a bridge to IBM mainframes running under the MVS operating system.

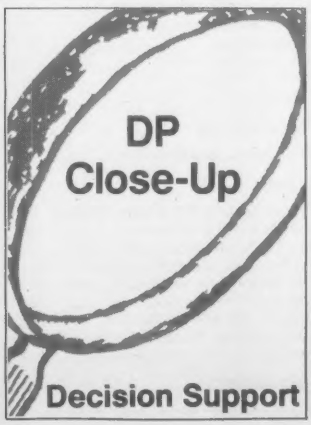
Called the Stratus Office Solution, the packages also provide some office management capabilities, such as electronic mail and calendar management, and can convert Stratus/32 data and files to or from microcomputer-based spreadsheet formats, a Stratus spokesman said. SOS is also compatible with IBM 3270 and Ascii-based terminals.

Six of the software packages composing SOS run on the 32-bit Stratus/32 processor, which acts as a host. The seventh package, SOS Ascii, operates on IBM's Personal Computer. The seven packages are:

- SOS/Exec for electronic mail and calendar management, resource scheduling and office-oriented electronic filing.
- SOS/Main, consisting of Cobol programs and job control statements running under MVS. SOS/Main is also said to provide controlled access to MVS data by allowing the transfer of data files between processors running under MVS and the Stratus/32.
- SOS/Spread, which reportedly converts data files on a Stratus/32 to

(Continued on Page 15)

DSS Departments Becoming an MIS Reality



By Paul Gillin
CW Staff

They have grown from finance, marketing or management information systems departments. Some incorporate an information center while others are planning to evolve in that direction. The software tools they use are as diverse as the forms they take.

Whatever their structure, formal decision support system departments are becoming a highly visible adjunct to traditional MIS. Interviews with DSS managers conducted recently by *Computerworld* indicate that in many companies, the departments are now reporting on a level equal to the MIS function.

At Mead Corp. in Dayton, Ohio, for example, the manager of decision support applications supervises a staff of five managers and reports on the same level as the MIS director. The functions reporting to Clay Sundermeyer include the information center, office systems, financial modeling and decision analysis within operations research. A personal computer information center will be established soon.

The decision support function grew out of operations research after "a general ground swell of interest" became apparent three years ago, Sundermeyer said. A staff of 10 now supports 850 users, "covering just about every function in the company." Users include most of the company's top executives, who have programmed function-key access to a

(Continued on Page 8)

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Please address all correspondence to the appropriate department at Box 880, 375 Cochituate Road, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 95-1153.

OTHER EDITORIAL OFFICES & SALES OFFICES:

New York: Suite 7G, 401 East 80th St., New York, N.Y. 10021. Phone: (212) 570-2135.

West Coast: 1060 Marsh Rd., Menlo Park, Calif. 94025. Phone: (415) 328-8064.

Washington, D.C.: 880 National Press Building, 529 14th St. N.W., Washington, D.C. 20045. Phone: (202) 347-6718.

England: Terry Cartwright, EEC Publications, 196-200 Balls Pond Rd., London N1 4AQ. Phone: 01-359-3525. Telex: (851) 894085 (Computer Management, Computer Business Europe only).

Euan Rose, Bill Dunlop, Stephen Thomas, Beere Hobson Assoc., 345 Goswell Rd., Islington, London EC1V 7HN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe)

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblois, Le Monde Informatique, 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 756 14 14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 551-3882. Telex: 252-4217 (Computerworld Japan only).

Esteban H. Yamada, Tokyo Representative Group, Yamaguchi Bldg., 2-12-9 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101. Phone: (03) 230-4117/8. Telex: J26860 (reps for all CWCI publications except Computerworld Japan)

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Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l., Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5583/5584.

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To Move Users to VM, MVS

IBM to Sell UCC Conversion Tool

By Paul Gillin
CW Staff

WHITE PLAINS, N.Y. — In an action that continues IBM's push to move users of its DOS operating system into either a VM or an MVS environment, the computer giant last week announced that it will sell University Computing Co.'s UCC-2, a DOS-to-MVS conversion facility.

UCC-2 allows DOS programs to be moved into an MVS environment without source code conversion, a spokesman said. The product thus reduces conversion time by up to 60%.

DOS facilities not available under MVS are supported by UCC-2, and MVS facilities are immediately available on DOS programs.

'Nothing Comparable'

The product is the most complete DOS-to-MVS conversion tool IBM has ever offered, a spokeswoman said. "We have had JCL conversion and conversion to VM, but nothing comparable to UCC-2," the IBM representative said.

The UCC-2 linkage editor produces executable, partition-independent MVS modules from DOS object or Core Image Library modules. The existing DOS linkage editor control statements control the UCC-2 link edit process. When a DOS program is executed under MVS, the UCC-2 interface captures DOS service requests, interprets them and automatically invokes the appropriate MVS or UCC-2 service routine.

Analysts contacted by *Computerworld* last week said the announcement reflects IBM's commitment to make MVS and VM its premier operating systems. "It's becoming clear that DOS is the odd man out," said Frank Gens, director of information systems research at The Yankee Group, a Boston consulting firm.

A Wider User Range

Gens noted that the agreement is consistent with IBM's release of MVS on the recently announced 4361 processor [CW, Sept. 19]. IBM has thus indicated that it will extend the operating system to a wider range of users.

"We may later see DOS pushed in under VM as a batch initiator," Gens said.

But IBM's spokeswoman said the push is from the other direction. "It's not that we're trying to force this trend. We saw many of our customers moving from DOS to MVS, and this is our response," she said.

Concerning the 4361 and 4381 processors, she said, "These machines should be using MVS. When running multipartitions, sharing Dasd [direct-access storage devices] and moving on-line, MVS will better accommodate this growth."

"It's a good move," said Bob Cook, president of VM Software, Inc. in Falls Church, Va. "IBM has been pushing users for a while [to migrate away from DOS]. The problem has been a transition."

However, Cook noted that MVS is not an ideal alternative for many current DOS users and that the company has failed to provide adequate tools to execute in batch under VM. "VM's batch capabilities are not very good," he said. For IBM to expect DOS users to migrate, "They're going to have to give them some better production tools under VM. I don't think we'll see DOS being pushed aside until that happens," he said.

IBM will make UCC-2 available in the first quarter of 1984 for a one-time charge of $45,000. Its National Accounts Division is located at 1133 Westchester Ave., White Plains, N.Y. 10604.

Corrections

Because of an error during the production of the Oct. 31 issue of *Computerworld*, the announcement of the TRS-80 Model 16B desktop computer from Radio Shack did not appear on Page 85 as scheduled. That story appears in today's issue on Page 16.

The average response time of Primdata's 3033 mainframe ["Calif. Users Offered Access to Swedish CPUs," CW, Sept. 26] is .7 sec, not seven seconds.

A chart accompanying "Micro Explosion Forces T/S Vendors to Refocus" [CW, Sept. 12] contained erroneous information about the remote computing services offered by Comshare, Inc. The correct information about the Comshare services follows: Business Information Systems (IBM-based); VM/CMS, MVS/TSO; Commander II (Honeywell, Inc.-based).

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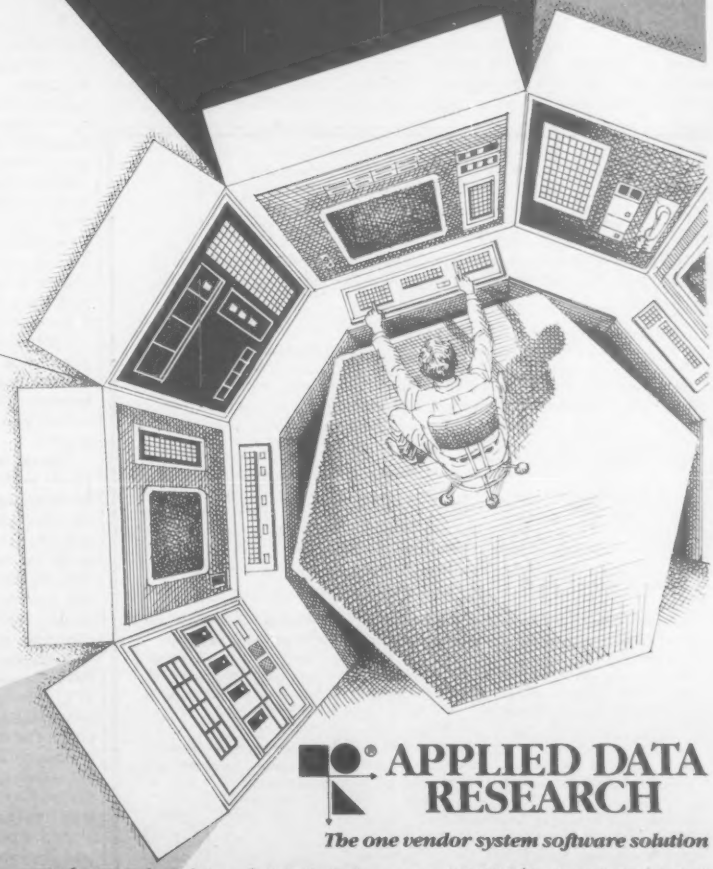

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Pacific Tel Installs Fiber-Optic Local Loops

By Phil Hirsch
CW Washington Bureau

SAN FRANCISCO — Pacific Telephone and Telegraph Co. installed three fiber-optic local loops in downtown San Francisco last week — the first such facilities to be added to its transmission network.

The new facilities will be able to put at least 90M bit/sec of digital transmission capacity on the doorsteps of some 200 downtown business locations. However, each location can be provided with up to 270M bit/sec of full-duplex digital transmission capacity.

Similar local loops were installed earlier in Miami by Southern Bell Telephone Co. However, those in San Francisco are connected to a much more extensive intercity fiber-optic communications network. As a result, they may be a better harbinger of what telecommunications users throughout the country can look forward to, as Bell operating companies, encouraged by divestiture and spurred by competition from vendors of bypass services, add wideband facilities to their facilities.

Pacific Tel's fiber-optic channels will connect all of California's major cities by 1986, according to spokesman Craig McDonald. "At that time, our network will be the most extensive in the nation, and it should be capable of providing the bulk of our business customers with high bit-rate, integrated digital voice, data, video and image services end to end," McDonald said.

At last month's Telecom '83 conference in Geneva, Switzerland, Charles L. Brown, AT&T's board chairman, said his company plans to market a broadband local-area network, developed by Bell Labs, to telephone operating companies [CW, Oct. 31]. Brown indicated that one of the first users would be Pacific Tel.

Brown was referring to fiber-optic local loops of the type Pacific Tel is installing in San Francisco. Each loop contains 72 paired fibers; 68 of the pairs carry customer traffic, explained Aaron Baker, one of the project's managers. Since each fiber-optic pair physically connects a different terminal location with a local telephone switching center, the cable is logically a broadband local-area network composed of 68 separate channels, each carried on a separate fiber pair but within a common cable.

Pacific Tel has begun marketing the three loops installed last week, and Baker confirmed a report that Bank of America is one of the prospective users.

Loops to Support '84 Olympic Games

LOS ANGELES — Besides San Francisco, Pacific Telephone and Telegraph Co. is also installing fiber-optic local loops in the Los Angeles area, where they will be used initially to support next year's Olympic Games.

The events comprising the Games will take place at 19 locations scattered throughout the Greater Los Angeles area. The most remote sites are 90 miles north, 33 miles east and 110 miles south of the city. The new local loops will connect these locations (officially referred to as "venues") via a fiber-optic network that is slated to be completed this month to interconnect all of Pacific Tel's switching centers in the area.

The major Olympic Games application will be electronic mail. Through approximately 2,000 terminals distributed among the venues, the press, athletes and Games administrative staff will be able to access electronic mailboxes housed in a computer complex located in downtown Los Angeles.

The complex consists of 12 Model 3B20S minicomputers, general-purpose machines developed by Western Electric about two years ago. AT&T plans to begin marketing the 3B20S, a modification of the computer used in some of AT&T's electronic switching systems, on an OEM basis outside the Bell system, AT&T Chairman Charles L. Brown announced at Telecom '83 last month in Geneva, Switzerland [CW, Oct. 31].

The electronic mail terminal to be used at the '84 Olympic Games is a new keyboard/CRT, the Model 5410, manufactured by Teletype Corp. Capable of operating in both directions at 1,200 bit/sec, the 5410 is said to be more user-friendly than Teletype's older electronic mail terminals.

Could a scaled-down version of this hardware and software be fashioned into a local-area network? Ira Jacobs of Bell Laboratories indicated at Telecom '83 that AT&T has such a product in mind. "Planned Bell system fiber-optic applications," he reported, "range from short links within a building to transcontinental terrestrial and intercontinental undersea links."

Reagan Backs Carriers in Access Fee Battle

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The Reagan administration last week lined up alongside the nation's other common carriers in a dispute with the Federal Communications Commission (FCC) over charges to access the nation's long-distance telephone network that are slated to become effective April 3.

The dispute involves the differential between what the other common carriers pay for local exchange connections — which are generally agreed to be inferior — compared with what AT&T Communications, formerly the Long Lines Division, pays for local exchange connections. Under present tariffs, the other common carriers pay 65% to 75% less than what AT&T Communications pays for local exchange connection; during the first year the access charge is in effect, the differential will drop to 25%, according to the other common carriers.

Over a three-year period, the other common carriers will gradually be offered interconnection equivalent to what AT&T Communications receives, and the differential will disappear.

The other common carriers' complaint is that the improvement will be only slight next year, but their access charges will be more than twice as high. The result, according to a request for reconsideration sent to the FCC by the other common carriers last month, is that they will be precluded from becoming "meaningful competitors."

Secretary of Commerce Malcolm Baldridge agreed. In a letter sent to FCC Chairman Mark Fowler last week, Baldridge said the proposed cut in the differential is "a matter of serious concern. . . . We have carefully reviewed [the other common carriers' request for review and] believe they advance a sound case."

Accompanying Baldridge's letter was a proposal drafted by the National Telecommunications and Information Administration (NTIA), which is part of the Commerce Department, proposing an alternative access charge plan. According to the NTIA, its plan would relate the other common carriers' access charges more closely to the quality of the interconnection they receive.

Jack Smith, chief of the FCC's Common Carrier Bureau, said he expects the commission to rule before Christmas on the requests for reconsideration of the decision.

AT&T, however, called the administration's action "disappointing" because it would "continue to subsidize a discount of more than 50% for our competitors."

January Vote Eyed for S. 1660

WASHINGTON, D.C. — In additional developments related to the Federal Communications Commission's (FCC) access charge decision:

- Senate Majority Leader Howard Baker (R-Tenn.) said last week he plans to bring S. 1660 to the floor of the U.S. Senate for a final vote early next January. The legislation would drastically alter the FCC's access charge plan and make a number of other structural changes in the U.S. telecommunications industry.
- The U.S. Court of Appeals has delayed further consideration of several appeals asking review of the FCC access charge decision. The court pointed out that pending legislation, if enacted, would make major changes in the plan. It also said that the FCC, in the process of reviewing the voluminous tariffs filed recently by AT&T and the Bell operating companies to implement the plan, will reconsider many of its key provisions.

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Shelling of 'Peanut' Leaves Corporate Users Hungry

(Continued from Page 1)

year, will be sold through retail outlets as well as by IBM's national accounts and national marketing crews. IBM spokesmen at the press gathering here last week admitted the company had missed the Christmas season with the computer.

IBM said in a prepared statement that the new machine is aimed at the home, classroom and office markets. But industry analysts questioned after the press conference whether the machine is right for corporate users of the IBM Personal Computer who might want a compatible micro to use at home.

"My feeling is that this marks IBM's entry into the home market and nothing more," one analyst said privately. "This is the kind of machine a guy buys his kid to learn about computers."

Many analysts at the PCjr's debut complained about the computer's keyboard, which several observers described as "toy-like." The keyboard has 62 keys, is detachable and can be powered by small batteries for cordless, infrared operation.

Most criticisms of the device centered on its lack of function keys. "Unless you build in a high degree of functionality, you're stripping it down to the level of the lowest common denominator," one analyst said.

An IBM product manager said the keyboard is "mapped" for the same functions performed by the Personal Computer, but admitted that the missing function keys would mean that multiple keystrokes would be required to perform those functions. IBM would not say who built the keyboard for the company, nor would it reveal the keyboard's life expectancy.

The PCjr is equipped with an Intel Corp. 16-bit 8088 microprocessor. The $1,269 version of the machine, fitted with a 360K-byte 5¼-in. double-sided disk drive, runs Release 2.1 of PC-DOS. IBM said this operating system makes the PCjr compatible with a selection but not all of the diskette programs written for the Personal Computer. The Personal Computer runs under PC DOS 2.0 and Microsoft, Inc.'s MS-DOS, as well as Digital Research, Inc.'s CP/M 86 and MP/M 86.

Along with the PCjr, IBM is offering an internal $199 asynchronous modem, which a spokesman said would equip the small computer for office use.

In related announcements, IBM took the wraps off two new printers. One, a $175 thermal printer, was designed for the PCjr but can be adapted via a connector to operate off the company's Personal Computer and Personal Computer XT. The second peripheral, priced at $1,995, is an eight-color printer for the Personal Computer and XT microcomputers.

The PCjr can be used at home, in the classroom or at the office, IBM said, but admitted it can not run all of the Personal Computer software.

PCjr Memory, Operating System Spark Analysts' Concern

By Tom Henkel
CW Staff

Is it a toy or the answer to an executive's prayer?

IBM seems to think the PCjr, its latest and smallest microcomputer, is both. Industry watchers and corporate users of IBM's larger Personal Computer and Personal Computer XT had mixed opinions when they were interviewed last week after the newest micro's formal introduction.

IBM is promoting the PCjr's ability to run computer games, home finance and educational applications. An IBM spokesman, however, was quick to point out that the PCjr can also run almost any application designed for the Personal Computer and Personal Computer XT — provided those applications take up less than 128K bytes of memory and are compatible with the PCjr's operating system — PC-DOS Release 2.1.

The memory and the operating system of the PCjr seem to be the two major concerns of consultants and corporate users of IBM micros. Everyone seems to agree that the low-end $669 PCjr configuration is virtually worthless for any kind of serious business application. But the larger $1,269 model, which offers 128K bytes of main memory and a floppy disk drive, can be enhanced with a printer, modem and monitor to be adequately used as a home supplement to an office-based Personal Computer or Personal Computer XT. Several industry watchers, however, suggested that most business users of the PCjr will spend at least $1,500 on a complete system.

The PCjr uses a new release of IBM's PC-DOS operating system, which was designed to accommodate the slower "slim-line" disk drive used on PCjr. For most applications, an IBM spokesman said, Release 2.0 and 2.1 applications should run interchangeably. But the spokesman could not promise all applications would run without a hitch. IBM plans to review all the applications available for the Personal Computer or the PCjr "on a case-by-case basis" to identify problem applications.

Another question surrounding the PCjr is whether the unit will offer enough main memory to accommodate business applications. The currently available 128K bytes is not enough to run commonly used business applications, such as Lotus Development Corp.'s 1-2-3, noted Ted Kaplan, president of the Boston Center for Computer Applications.

The trend toward user-friendly microcomputer applications has created a subtrend toward larger, more sophisticated software programs, Kaplan said. He noted that 1-2-3 requires a minimum of 192K bytes.

But in addition to 128K bytes of main memory, the PCjr has two slots to accommodate read-only memory (ROM) cartridges. Skip Bushee, executive vice-president at Infocorp, a Cupertino, Calif.-based microcomputer market research firm, contended that software companies offering floppy disk versions of programs for the Personal Computer and Personal Computer XT will soon start marketing those programs on ROM cartridges for the PCjr.

One user interviewed last week, Joseph Brophy, senior vice-president of management information systems at Travelers Insurance Co. in Hartford, Conn., thought the PCjr "looked pretty good." Travelers, which has approximately 4,000 corporate Personal Computer and Personal Computer XT micros, is considering buying large quantities of the PCjr and offering them to employees, possibly on a payroll deduction scheme or at a discount.

Infocorp's Bushee emphasized that while IBM is currently offering a bevy of games and home-computing software for the PCjr, its real target market is the executive. Games and other software that might appeal to the rest of the family serve as an added benefit in helping the business user justify buying the home unit, he said.

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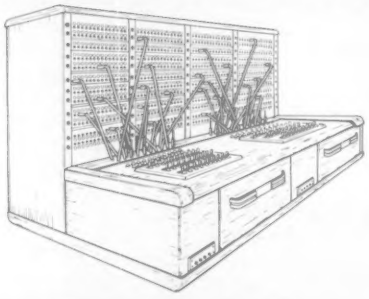

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Formal DSS Departments Becoming Reality

(Continued from Page 1)
customized set of decision support tools created within the company (see story below). More than 30 Mead locations can access the central DSS through leased line or asynchronous communications.

A distributed DSS at Harris Corp. in Melbourne, Fla., supports 1,200 active users "addressing everything from financial analysis to corporate management and manpower planning" in the areas of marketing, finance and accounting, production and program management.

According to Richard Wood, manager of decision support services at Harris, the department is "literally a worldwide time-sharing network with DSS networked into the corporate mainframes." Using Harris satellites, common carrier telephone lines or Tymshare, Inc.'s Tymnet, "you can be anyplace in Europe, Asia or North America and dial up a local phone number to connect into the DSS center."

DSS billed $1.1 million for services last year, the equivalent of $10 million to $12 million worth of commercial computing, Wood said.

Harris' four-person DSS consulting and education staff is largely from a business background. "We have found it's easier to train them in the required amount of MIS activity they need to know than in the business acumen," Wood said.

Although the staff is small, the work load has been manageable. "We find users have to be very quickly self-sufficient," Wood said. "Often they use local MIS people to help them in systemization, and they do their own applications."

Resentment and Tension

Some managers interviewed by *Computerworld* reported that they have had to cope with some resentment from MIS employees toward the high-visibility DSS function. "At first there was a sort of antagonism among MIS that I had this high-visibility position," said Nancy Stager, manager of DSS at Unitrode Corp. in Lexington, Mass. "We dealt with that by giving credit where credit was due on all projects. And the MIS manager and I have a lot of respect for each other."

There was also some initial tension between DSS and MIS at Cal Gas Corp. in Sacramento, Calif., according to John Skelly, manager of business systems support. "DP is a thankless task," he said. "When these guys saw us working with top management and getting all the kudos, there was some resentment. We dealt with it by interviewing in-house to see if DP people had career goals in this area. But we emphasize that they have to learn the concepts of the business first."

Skelly was one of the original members of the DSS group chartered in 1978 at Dillingham Corp., Cal Gas' parent company. The group was created out of MIS after "we found we worked a lot with management doing financial modeling and data access. It struck us that what we were doing was more in line with DSS," he said.

Skelly now supervises one programmer/analyst in a department that serves about 20 users, most of whom are upper level executives. The department works closely with MIS on many projects, and DSS has even been incorporated into some production applications.

Maintaining close ties with MIS was also cited as a critical factor by Unitrode's Stager. DSS evolved there about four years ago when the company installed a Hewlett-Packard Co. HP 3000 minicomputer.

"The execs were frustrated because they had spent all this money developing these on-line systems, and the lower level people were getting all the benefits while they weren't getting any pay back," Stager recalled. "It got to be that more than 50% of my job was doing ad hoc requests."

Supported in large part by the vice-president of corporate planning, Stager developed the DSS job and has written most of the applications to support the 10 regular users. She also maintains the extracted data base that users access with microcomputer-based tools. DSS at Unitrode is heavily dependent on microcomputers, she said. Some programmers are working on micros now, and a link to the HP 3000 is planned for 1984.

Managers List Most Popular DSS Tools

By Paul Gillin
CW Staff

To succeed in business, a decision support system (DSS) function must be small and use a lot of customized software. That was the consensus from DSS managers interviewed recently by *Computerworld*.

Among the most popular DSS tools listed by users are financial modeling and analysis packages, data base management systems (DBMS), graphics and high-level languages. Most DSS departments surveyed also provide customized query and retrieval systems that offer "one-button" answers to nontechnical users.

The heart of the decision support applications department at Mead Corp. in Dayton, Ohio, is a reporting and graphics tool developed in-house and called the Executive Information System (EIS), according to Clay Sundermeyer, manager of the department. Written with extensive input from executives, the system allows the user to perform programmed function key graphics and exception reporting with a full set of query capabilities customized for Mead executives.

Other Tools

Other tools include SAS Institute, Inc.'s SAS; Execucom Systems Corp's Interactive Financial Planning System (IFPS); IBM's Professional Office System (Profs); Information Builders, Inc.'s Focus; and a mainframe spreadsheet called Electronic Spread Sheet from Trax Softworks, Inc. of Los Angeles. The department has a dedicated IBM 3032 mainframe with the VM/CMS operating system and Information Builders' Focus fourth-generation language and DBMS.

Users can access EIS directly from IBM's Profs by pushing a programmed function (PF) key. The goal in designing such ease-of-use features was "to create an integrated environment in which users don't have to feel like they have to learn a whole bunch of programs," Sundermeyer said. "The same PF keys are largely transportable across Profs and EIS."

Similarly, the business systems support group at Unitrode Corp. in Lexington, Mass., relies upon an internally developed system called the Decision Support Data Base, an ad hoc query and reporting package based on Hewlett-Packard Co.'s Image DBMS and a report writer from Quasar Systems, Ltd. of Canada. Data is loaded from the production data base into the DSS data base each week.

A key element of a successful DSS department is "good relations with MIS [management information systems]," said Nancy Stager, manager of DSS. "I haven't had to hire any people because I can always go to MIS for help," she said. Expenses for computing are shared between the two departments; between 10 and 20 IBM Personal Computers are being brought in next year under the DSS budget.

A successful DSS function must be small, responsive and tightly tied in with MIS, according to John Skelly, manager of business systems support at Cal Gas Corp. in Sacramento, Calif. "The DSS service can't be effective if it's large," he noted.

DSS at Cal Gas initially reported to the vice-president of finance, which "at the time was appropriate because it caused people to recognize that the service was more like a planning department."

However, business systems support is now tied more closely to MIS. The departments will soon share a Digital Equipment Corp. VAX-11 superminicomputer running Oracle Corp.'s Oracle relational DBMS and IFPS for DSS functions.

"You should try not to distinguish for users between DSS and MIS," Skelly said. "Ultimately, if you have MIS as a separate service then DSS belongs there."

The key to managing a successful center with a large number of users "is to pick the right software and integrate it," according to Richard Wood, manager of decision support services at Harris Corp. in Melbourne, Fla. Harris' four-person DSS department serves 1,200 users with a style that emphasizes up-front training and handing over control to users as quickly as possible.

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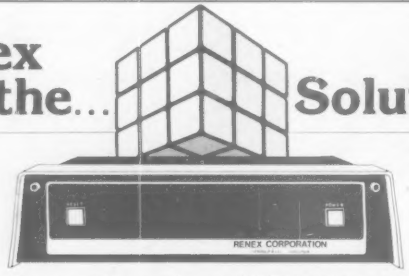

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Sperry Combines Mapper, 1100 To Form DSS

By Tom Henkel
CW Staff

BLUE BELL, Pa. — Sperry Corp. today announced that it has combined its fourth-generation language, Mapper, and a 36-bit, very large-scale integration version of its 1100 series mainframe to form a new stand-alone system, the Mapper 10.

Designed for executives, middle managers and administrative personnel, Mapper 10 is a decision support system which Sperry said allows users to bypass the DP department and develop their own applications. It is software-compatible with other Sperry mainframes.

Capabilities that allow the Mapper 10 to access information stored in IBM mainframes will be available in November 1984, Sperry said.

Available in three basic configurations, Mapper 10 allows users to organize, manipulate and extract needed information. The software has been available for Sperry 1100 and System/80 Series processors for about two years.

The Mapper 10 system features color graphics, word processing, electronic mail and similar office functions. In addition, it permits relatively unsophisticated users to initiate data searches, sorts, merges and computations necessary to carry out "what if" analysis, Sperry said.

Most users can learn the basics of the system folowing a two-day training course, a spokesman said.

In addition to the Mapper software, the Mapper 10 can be equipped with Sperry's Sufics, a nonprocedural financial modeling and business planning package. The Sufics software costs $26,950.

Color Graphics Option

Also available for the Mapper 10 is a color graphics option which allows connection of color terminals and a color plotter. The $5,400 option allows users to display numerical information graphically.

The hardware component of the Mapper 10 system consists of a 36-bit central processor which can be equipped with 2M to 8M bytes of main memory. The system supports up to 32 users. The Mapper 10 processor is roughly equivalent in power to the 1100/60 and can accommodate up to six fixed disk drives for a maximum disk capacity of 1.2G bytes. Its basic configurations are:

- The entry-level offering, which features 2M bytes of main memory, console, two fixed disk drives (408M bytes), one streaming tape drive and one printer. It costs $200,000.
- The mid-range configuration, which offers 4M bytes of main memory, console, four fixed disk drives (816M bytes), one streaming tape drive, two Sperry Uniservo 22 tape drives and one printer for approximately $350,000.
- The top-of-the-line configuration, which offers 8M bytes of main memory, up to six fixed disk drives (1.2G bytes), two streaming tape drives, four Uniservo 24 tape drives and printer for about $550,000.

Sperry can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

Student Charged With Tapping Into Arpanet Sites

By Katherine Hafner
CW Staff

LOS ANGELES — A University of California student here was arrested last week and charged with 14 counts of felony after he allegedly broke into some 200 computer accounts at computer sites around the world linked to the U.S. Department of Defense's Advanced Research Projects Agency Network (Arpanet).

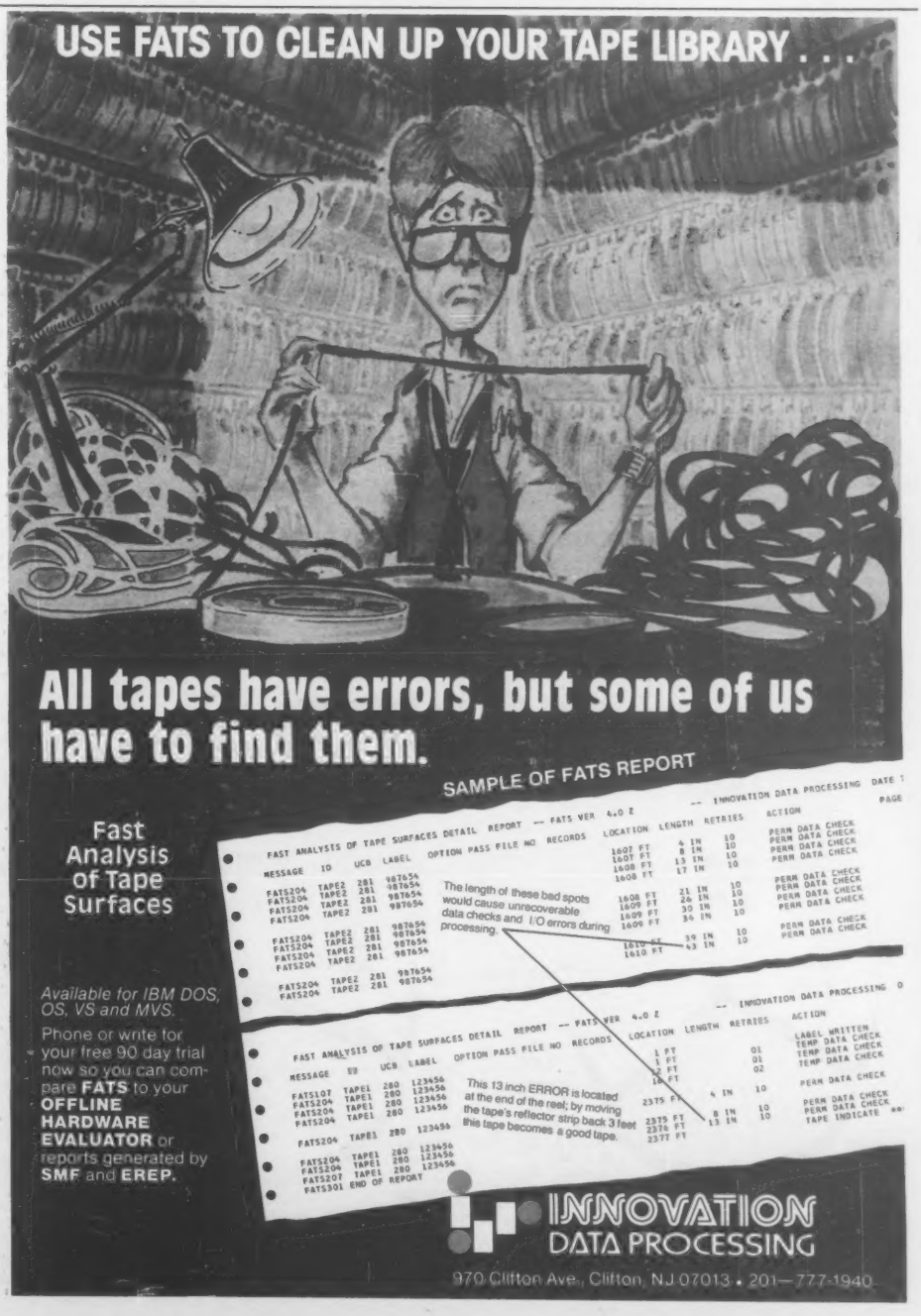
Ronald Mark Austin, 19, was arrested last Wednesday at his home in Santa Monica, Calif., held on $10,000 bail and arraigned the following day. The arrest was made by the Los Angeles District Attorney's office.

Austin reportedly used his home computer to gain access to 14 sites participating in Arpanet. He allegedly tampered with several hundred computer accounts and in some cases destroyed information files.

If found guilty, Austin faces penalties ranging from 16 months to three years in prison and a $5,000 fine on each count, with a maximum sentence of six years.

"This is more than a prank pulled by a young kid playing games on his computer," said Al Albergate, press secretary in the district attorney's office. "We estimate it will cost all these different agencies and institutions hundreds of thousands of dollars to reprogram their systems."

The sites Austin allegedly tapped include The Mitre Corp. in Bedford, Mass.; the Naval Ocean Systems Center in San Diego; the Naval Research Laboratory in Washington, D.C.; the Rand Corp. in Santa Monica; the Telecommunication Administration in Norway; Purdue University in West Lafayette, Ind.; BBN-Communications Corp. in Cambridge, Mass.; the University of California at Berkeley and Los Angeles; the University of Wisconisn; SRI International of Menlo Park, Calif.; Computer Science Network of Madison, Wis.; Cornell University in Ithaca, N.Y.; and Information Science Institute of Marina Del Rey, Calif.



Survey Finds 'Plain-Vanilla Programmer' Less

By Lynn Haber
CW Staff

NEW YORK — There is some good news and some bad news for technical specialists in a recent survey of the DP job market that was compiled by Dunhill Personnel Systems, Inc. here.

The good news is that, relatively speaking, the number of jobs for systems programmers and programmer/analysts increased dramatically during the first half of 1983 compared with the first half of 1982. Systems programmers increased their piece of the DP salary pie by 7.7%, and programmer/analysts took a 48.4% slice of the same pie, a 3.3% increase from the previous year (Figure 1).

The bad news: programmers' hiring share was cut by almost 5%, reinforcing the trend in which hiring officials are finding the "plain-vanilla programmer," once the industry's mainstay, a less attractive commodity.

The new figures, compiled by Dunhill computer and DP specialist Rick Kean, indicate that the shift in DP job roles and functions precipitated by the economic hard times in 1982 are continuing into 1983. "Since 1982, there have been very extensive changes in the marketplace, which created some hiring rules, and as we went into 1983, it was anticipated at least by some that these rules would change back to the old way. But that's not what's happening," Kean said. "The relationship between services and manufacturing firms, in terms of who's hiring, remained almost the same since 1982.

'Since 1982, there have been very extensive changes in the marketplace, which created some hiring rules, and as we went into 1983, it was anticipated at least by some that these rules would change back to the old way. But that's not what's happening.'

"And," he added, "the trend that had already started toward hiring programmer/analysts and system programmers over programmers and systems analysts continued to grow." As firms implement more applications packages, the programmer increasingly needs to become a generalist. "You've got to be a little bit of a systems analyst, a little bit of a programmer — and a lot of a politician," Kean noted.

Another indication of the lack of demand and interest shown by hiring officials toward programmers is a decline in the average salary that programmers are being offered. According to the study, salary levels for all other groups increased, though the composite growth rate in the first half of 1983 was lower (4.6%) than it was in the first half of 1982 (5.3%). When programmers were excluded from the equation, the composites for the remaining three titles showed an 8.1% increase for the first half of 1983 compared with 6% in the first half of 1982.

Salaries for programmer/analysts did not climb significantly since 1982, and the percentage of increase was not as great in 1983 as it was in 1982, but the trend toward increased salaries for programmer/analysts is starting to accelerate.

According to the survey analysis, programmer/analyst salaries increased faster than any other group in 1982 and slacked off in early 1983 as demand caught up with a slightly overabundant supply.

"The feeling is that around January, even though the economy was beginning to recover, the signs weren't clear enough for companies to have the confidence to go out and make a lot of decisions, so I think there was just a bit of a breathing period there for a while," Kean said.

System programmers' salaries rose

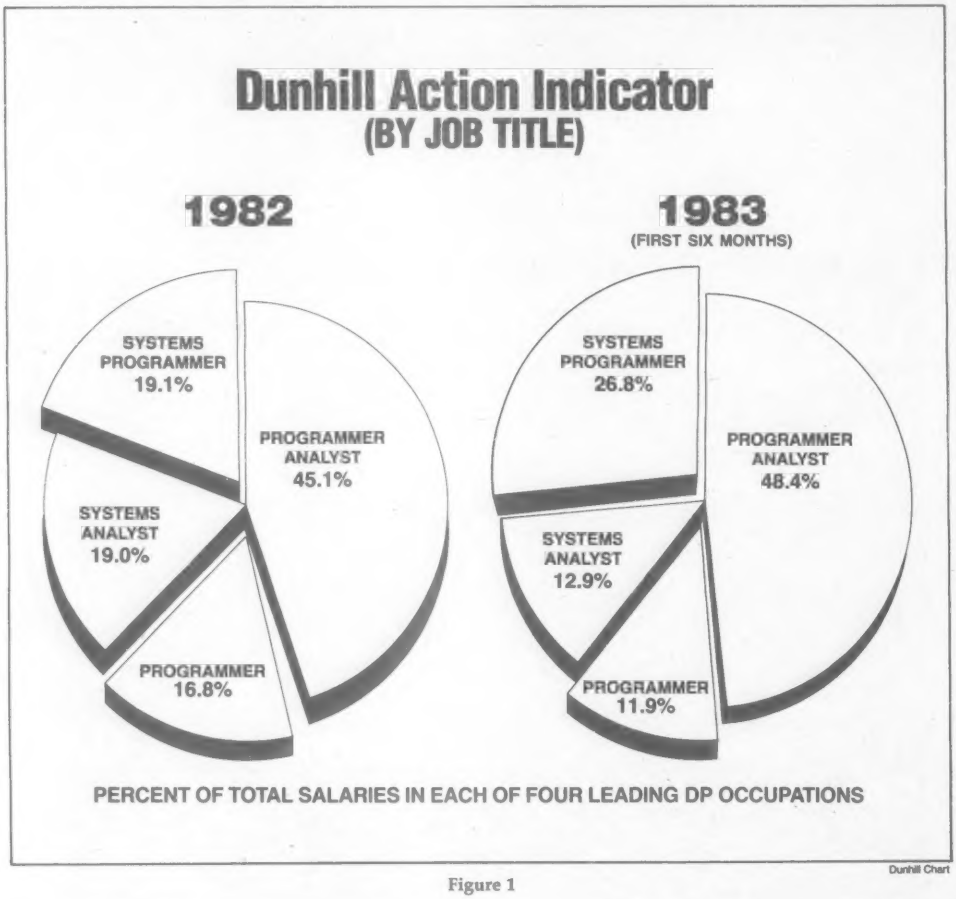


Figure 1

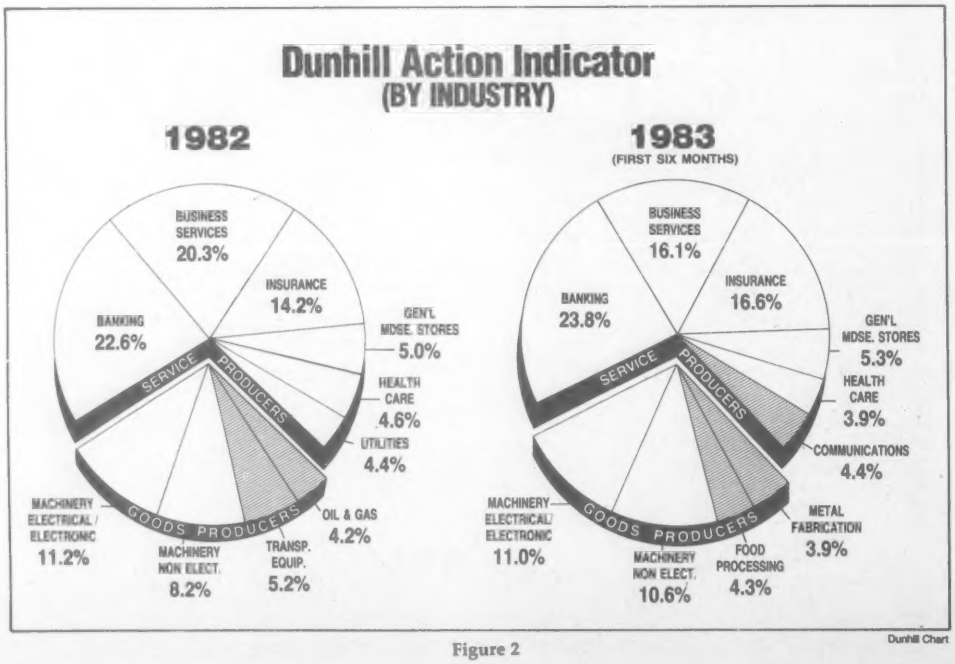


Figure 2

Attractive Commodity

because the programmers were in increasing demand — a demand supported by the growth of packaged software, the need to interface mainframes with small computers and the growth of data communications and data base applications, according to the study.

"The more software packages there are, the more you need a doctor if something goes wrong," Kean observed.

System analyst salaries have gone up even though the amount of hiring activity for them has gone down. "A lot of companies using the system analyst title are really hiring a person who is a functional manager. What they're hiring functional managers for is not so much for analyst skills, which they get from the programmer/analyst, but more for the supervisory skills — the system analyst person will be tying together a series of modules developed by different projects. The whole function is really changing," Kean said.

'The more software packages there are, the more you need a doctor if something goes wrong.'

The result of this changing definition of the system analyst's job, he said, is that those who hold this title occupy a more senior position and, therefore, command more money.

Survey data also shows that overall hiring demand is increasing and that with a gradually accelerated growth in demand, a candidate-scarce situation by the end of the first quarter of 1984 can be expected.

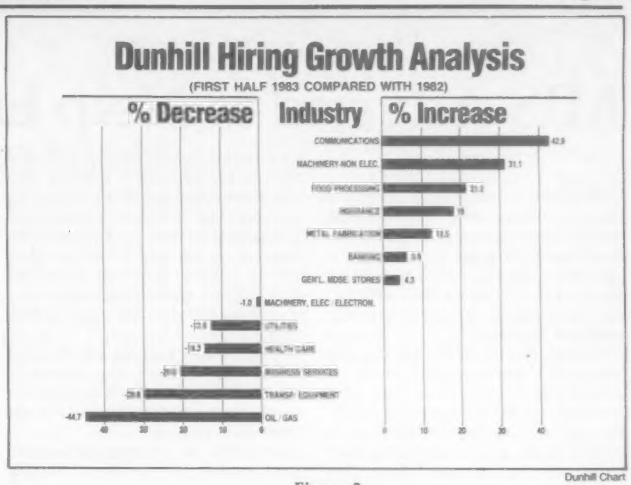


Figure 3

Survey Reveals Stability In DP Job Mart

NEW YORK — The profile of the DP professional currently in high demand may be changing, but there has been almost no change in where he is most likely to find a job.

A recent survey of the DP job market by Dunhill Personnel Systems, Inc. found that information-intensive service producers like banks and insurance companies moved down only 1% (from 71.1 to 70.1%) in terms of hiring action during the first half of 1983. As in 1982, manufacturers provided approximately 30% of DP-related jobs so far this year (see Figure 2 on Page 10).

This stability indicates that the changes evident during 1982, when service producers began to provide the majority of jobs in the DP area, are structural rather than temporary aberrations, Dunhill analyst Rick Kean maintained.

However, data showing relative growth in specific industries (Figure 3) illustrates very rapid growth for communications (42.9%), nonelectric machinery (31.1%) and metal fabrication (12.5%). Slow but steady advances came in banking (5.9%) and general merchandise stores (4.3%).

According to Kean, it is reasonable to expect that an industry segment with a small market share, such as communications, would post a large growth percentage. But what is surprising and very significant, he said, is that an industry segment with a large market share — machinery, nonelectric or business services, for example — would post a large change.

These changes indicate that although the impact of the manufacturing rebound has not yet arrived, it is on the way, Kean said.

"I don't think the 70:30 services-to-manufacturing relationship will become a 50:50 relationship in the forseeable future," he added. "But the relationship might change to, say, a 60:40 figure with services still dominating the hiring segment."

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PART NUMBER	DESCRIPTION	LIST PRICE	DISCOUNT	SALE PRICE**
TERMINALS/PRINTERS				
12-12560-01	SW, ROT 1P 3 POS	$ 20	50%	$ 10
19-10723-00	3404 LATCH 6 BIT 16 PIN	25	50%	13
23-104A1-00	A1-03, A1-04, A1-05	6	50%	3
~~23-12A1-00~~	~~A2-01, A2-02~~	~~45~~	~~50%~~	~~23~~
23-12A2 -00	A2-01, A2-02	43	50%	22
23-17A2 -00	A2-01, A2-02	43	50%	22
23-23A2-00	A2-05, A2-07	24	50%	12
23-43A2 -00	A2-01, A2-02	43	50%	22
23-86A6 -00	A6-01	39	50%	20
23-86E2 -00	E2-02 ROM 2K	20	50%	10
23-87A8 -00	A6-01	39	50%	20
23-8A2 -00	A2-01, A2-02	43	50%	22
29-11222-00	ROPE, DRAW WIRE	23	25%	17
54-04073-00	PHOTO-CELL AMPLIFIER	216	50%	108
54-04384-00	LOCAL POWER SUPPLY	97	50%	48
54-08310-04	PCO SWITCHBOARD	107	50%	53
54-08310-05	SWITCH PCO	119	50%	59
54-09457-00	NIXIE DISPLAY BD	255	50%	127
54-09914-01	CONTROL SWITCH BOARD	65	50%	32
54-11282-00	VT 61 PROM BOARD	1,061	50%	530
54-11284-02	VIDEO PROCESS MODULE FOR VT62	957	50%	482
~~54-12120-00~~	~~PRSO1 READER MODULE~~	~~329~~	~~50%~~	~~164~~
54-12120-00	PRSO1 READER MODULE	329	50%	164
54-13656-00	VT61 MEM BOARD	661	50%	330
70-06266-01	SUBASSY, BUSS WIRED-PC04-1	135	50%	67
70-07280-00	LOGIC LA30	485	50%	242
70-12030-00	XFORMER PLATE ASSY [240V,50HZ]	201	50%	100
74-04988-00	READER PLATE	145	50%	72
74-05300-00	CHAD BOX	21	50%	10
74-06089-01	PULLEY (60 CYCLE)	26	50%	13
74-06089-02	PUNCH MOTOR PULLEY (50 CYCLE)	33	50%	16
74-07438-00	COVER, P.S.	51	50%	25
74-08641-00	BASE	110	50%	55
74-08655-00	PULLEY IDLER RIBBON	4	50%	2
74-08656-01	LEG MACHINE LH	66	50%	33
74-08960-00	BLOCK, SWITCH	5	50%	2
74-08945-00	PAN BOTTOM	91	35%	59
74-11120-00	DOOR CAB (700-9648)	60	50%	30
~~74-11579-00~~	~~INSTALLATION KIT 70-9488 LA50~~	~~20~~	~~50%~~	~~10~~
74-11579-00	INSTALLATION KIT 70-9488 LA30	20	50%	10
74-12020-00	HOUSING WITHOUT FOAM	54	50%	27
74-13526-00	PUSHROD SHORT END	3	50%	1
74-15114-00	COVER PROTECTIVE CAPACITOR	6	50%	3
MEMORY				
G111 -00	SENSE INHIBIT	$ 817	50%	$ 409
G923 -YA	SENSE AMP MTI ONLY	2,036	50%	1,018
H212 -00	8K 12 BIT H211,MM8-EJ	1,662	50%	831
K202 -00	TWO GENERAL PURPOSE GATED F-F	51	35%	33
K210 -00	4 BIT BCD OR CINARY COUNTER	46	50%	23
M237 -00	12 BIT BCD U/D COUNTER	77	50%	39
M6850-00	16 BIT FLIP-FLOP DC OUTPUT	226	35%	147
M781 -00	PC11 CONTROL	528	50%	264
~~M781 -00~~	~~PC11 CONTROL~~	~~528~~	~~50%~~	~~264~~
M7880-00	FP11E FNUA(FLOATING POINT)	2,484	50%	1,242
M7983-00	32KX16 CONTROLLER	1,210	50%	605
M8098-00	ICR01 REMOTE MODEM CONTROL	1,051	50%	525
M8265-00	DATA PATH,HEX(KD11EA)	2,717	50%	1,359
M8266-00	CONTROL,HEX(KD11EA)	2,459	50%	1,230
M8294-00	32K TIMING UNIBUS INTFACE	506	50%	253
M847 -00	M8E BOOTSTRAP LEADER	809	50%	404
54-12418-00	5012415	41	50%	20
70-06993-00	HARNESS, POWER (PDP-8/E)	36	50%	18
MASS STORAGE				
A001 -00	8 CHANNEL UDC BRD	$1,196	50%	$598
A002 -00	UDC INPUT SIGNAL CONDITIONER	713	50%	357
A533 -00	4-10 BIT DAC'S	1,518	50%	759
~~A533 -00~~	~~4-10 BIT DAC'S~~	~~1,518~~	~~50%~~	~~759~~
B301 -00	SHOT DELAY	138	50%	69

PART NUMBER	DESCRIPTION	LIST PRICE	DISCOUNT	SALE PRICE**
MASS STORAGE (cont.)				
B410 -00	CLOCK VFO	104	50%	52
DF320-TA	TIME TRACK WRITE TESTER F/S	4,692	50%	2,346
G284 -00	DISC WRITER	54	50%	27
G291 -00	WRITER, DISK	60	50%	30
G295 -00	SERIES SWITCH	36	25%	27
G296 -00	CENTER TAP SELECTOR	346	50%	173
G589 -00	DIFF INTEGRATOR RP10	108	50%	54
G590 -00	DIFF FILTERED INTEGRATOR RP10	120	50%	60
~~G590 -00~~	~~DIFF FILTERED INTEGRATOR RP10~~	~~120~~	~~50%~~	~~60~~
G720 -00	RF08 TERMINATOR BOARD	23	25%	17
G906 -00	LINC 8 CAP PWR UP	48	50%	24
G906 -00	LINC 8 CAP PWR UP	48	50%	24
H810 -00	WIRE WRAP HAND TOOL	120	50%	60
H813 -00	#24 BIT	46	50%	23
H813 -A	#30 BIT	46	25%	35
H814 -A	#30 SLEEVE	27	25%	20
M080 -00	SOLENOID DRIVER	541	50%	271
M624 -00	BUS DRIVER	61	50%	31
M832 -00	CONVERTER-DRIVE POSITIVE INPUT	77	50%	39
M807 -00	RELAY, 16 BIT S.S.	1,029	50%	515
M8331-00	CASSETTE INTERFACE	1,139	50%	570
M8333-00	ASYNCHRONOUS SERIAL CHANNEL	1,152	50%	576
M8557-00	MASS BUS CONTROL 4	3,883	50%	1,941
M866 -00	SYNCH MODEM INTERFACE	575	50%	288
M906 -00	CABLE TERMINATOR	257	50%	129
SPRLB-A	RLB-A SPARE MODULE (M8433)	1,720	50%	860
W9042-00	FP11A EXTENDER BOARD	265	50%	133
29-19558-00	WAND, DISK CLEANING 12 EACH	3	35%	2
29-21295-00	PCBA PF 55-84 IPS	138	50%	69
29-22172-00	CABLE ASSY, SERVO CONTROLLER	214	50%	107
29-22234-00	PCBA POSITION SERVO	1,193	35%	776
54-11040-00	CAPACITOR BRD RK06	565	50%	282
70-13585-02	TE 16 7 TRACK NARROW RADIUS	1,935	50%	967
70-14296-00	CONE LIFT COVER ASSY	99	50%	49
74-07789-00	SPACER	1	25%	75
74-07979-00	KNOB	51	50%	25
74-09418-02	PULLEY MOTOR	7	50%	4
74-10768-00	FILTER SIDE PLR	13	50%	7
74-21078-01	PULLEY,RX01 MOTOR,50HZ	20	50%	10
EXPANSION PRODUCTS				
H808 -00	CONNECTOR BLOCK	$25	25%	$19
H850 -00	HANDLE EXTENDER (10/PKG)	19	25%	14
H8821-00	5012414	85	50%	43
H8822-00	50-1683,12-13508-01,12-13508	282	50%	141
H933 -CA	SYSTEM UNIT W/H803 + 2-H863	125	50%	62
H934 -CB	DBL SYSTEM UNIT W/6-H863,3-H8030	200	50%	100
K943 -WP	MOUNTING PANEL	319	50%	160
M1705-00	DUAL 12-BIT WORD OMN OUT INTE	858	50%	429
M1709-00	OMNIBUS FOUNDATION MODULE	272	50%	136
M7843-00	DIGITAL I/O DR11-K	902	50%	451
M929 -00	CABLE CONNECTOR	29	35%	19
W979 -00	COLLAGE BOARD	54	50%	27
W998 -00	VECTOR BOARD	13	35%	8
12-11474-00	FILLER STRIP 1.75	17	35%	11
70-12909-00	+ 5V REGULATOR ASSY	648	50%	323

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At 'Express' Users Group Forum

MIS Advised to Help End Users Define Goals

By John Gallant
CW Staff

BOSTON — Management information systems (MIS) professionals must help corporate managers clearly define their goals in order to design the tools they need to achieve them, the director of MIT's Center for Information Systems Research said here last week.

Speaking at the MDS, Inc. Express Software Users Group's Second International Conference, Dr. John Rockart urged MIS designers to utilize what he called Critical Success Factors (CSF) analysis to get managers to think about the information they need to fulfill their most important tasks. After management's information needs are clearly defined, he said, data bases and reports can be designed to meet those needs.

According to Rockart, who is also senior lecturer of management science at MIT's Sloan School of Management, CSFs are a set of tasks that must be achieved to meet corporate goals. Citing the U.S. auto industry as an example, he said that improved quality, sound pricing strategy and cost control are the CSFs behind the goal of survival in the face of increasing foreign competition.

Rockart said CSFs arise from the particular industry in which a company exists and from a firm's competitive position and strategy within that industry. He also said CSFs could be affected by temporal factors, such as a threatened strike or increasing government regulation.

MIS-Management Cooperation

Once CSFs have been defined, MIS designers must work with management to determine methods to measure progress toward their achievement. "This analysis is a bridge from the manager's world to the MIS world," Rockart said. "You must take the manager from a general view of his world — the corporate goals — to a more specific view of what the CSFs are. Once you determine the information you need to measure these CSFs, your information system needs are spelled out clearly."

According to Rockart, CSF analysis is useful in a number of different ways. It can be used to develop specific reports and data bases for use by an individual manager or a top-level management team. In addition, the analysis can be used to define information system planning priorities, pointing out where time and money should be spent in developing MIS tools.

Finally, CSF analysis can be used for management resource allocation to indicate where efforts must be focused to achieve the now clearly defined corporate goals.

Too often the process works in reverse, with DP personnel telling management, "This is the data base we have. Tell us what you need to know." But, he said, "it's difficult for managers to think of their information needs from the MIS end up. You have to take them from their end, the management end, to the MIS end in order to provide the necessary information systems."

CSF analysis is a "management focusing device" that MIS designers can employ with individual managers or with management teams in a "focusing workshop," Rockart said. "This is an excellent method to engage senior management, to draw their attention and make them understand the information they need."

Because the environment in which a corporation exists is constantly changing, he explained, management must be aware that corporate goals evolve as a result. As means to those ends, the CSFs also change, requiring a constant assessment of management information needs.

"If an analyst can understand the forces from which the CSFs arise, he can build a template of what management needs information wise," Rockart said. "But, that person must be able to interact with management to discover exactly what is needed. And, above all, the analyst must learn to listen."

European Users Establish Group

ROCKVILLE, Md. — Performance Systems, Inc. recently announced the formation of a European Scert Users Association.

The initial meeting of the association was held in London, Sept. 29. Elected as officers of the users association were Anne Marie Amos and Carol Piper of England's Customs and Excise Department, cochairwomen, and Richard Scotney of England's Inland Revenue Department, secretary.

A fourth officer and the board of directors will be elected at the next meeting on Nov. 17.

More information on the users group can be obtained from Performance Systems, 30 Courthouse Sq., Rockville, Md. 20850.

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Reagan, Deputy Commit Administration to OA

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — President Reagan and a White House official told a conference here last week that the administration is committed to improving government efficiency through office automation.

In a videotaped address to the Federal Office Automation Conference, Reagan spoke of his administration's efforts to control waste in federal programs and cut paperwork. "Despite these efforts," he added, "our government needs something more — good management."

Beyond efficiencies gained through automation of government clerical and support functions, Reagan said, "we need to get our managers and professionals into the act."

Saying "we owe it to the American people to give them a government that operates in a business-like manner," Reagan said the administration "will continue to develop our [OA] program to include managers and senior executives."

Craig L. Fuller, assistant to the president for Cabinet Affairs, said in his conference keynote address that because the product of government is information, "it is important that we have the best tools available to manage information." Fuller's office, which coordinates communications between the White House and the executive department and agencies, relies heavily on word processing, electronic mail and other OA technologies.

Of reliance on these technologies, Fuller said, "the president's come to accept it, the Cabinet members have come to accept it and the senior staff members have come to accept it."

Noting the explosive increase in office automation and microcomputer use in particular, Fuller told the conference that "we all better dedicate ourselves to learning how to use this resource wisely."

Washington Update

Supreme Court Upholds Win For IBM Over Transamerica

WASHINGTON, D.C. — The U.S. Supreme Court last week upheld IBM's victory in a lower court that ruled the firm had not violated antitrust laws as charged by Transamerica Corp.

Without comment, the high court refused to consider a Transamerica appeal of the adverse decision reached earlier this year by a San Francisco federal appeals court [CW, Feb. 28]. That decision confirmed a 1979 ruling against Transamerica in its suit involving IBM's pricing practices for peripherals.

Transamerica had charged IBM with driving it from the IBM-compatible peripheral market by predatory pricing. After a four-month trial and a hung jury, the judge in the original action ruled that IBM's pricing actions could not be found to have unreasonably or unfairly restricted competition in the peripheral market.

United Airlines Asks Court To Quash CAB Request

WASHINGTON, D.C. — United Airlines has asked a federal court here for relief from a Civil Aeronautics Board (CAB) investigation of the airline's computerized reservation system.

United said the CAB disregarded its own procedures and regulations in requesting airline documents in the ongoing CAB proceeding to develop regulations for computerized reservation system operations. The board's action is in response to complaints that United and other airlines offering computerized reservation services are unfairly hindering competition [CW, Aug. 15].

United asked the District Court here to quash the CAB request for documents relating to the rule making procedure. The airline said the document request is "at least in part an investigative subpoena designed to determine whether [United] and other [computerized reservation system] operators are engaged in unfair and deceptive practices."

The motion, filed Oct. 28, said the CAB should have appointed an administrative law judge in the proceeding and requested a subpoena for the documents.

Reagan Asked to Negotiate U.S. Access to NTT Bidding

WASHINGTON, D.C. — On the eve of President Reagan's trip to Japan, 15 U.S. senators have asked him to take steps to ensure American firms greater access to the Japanese telecommunications equipment market.

In an Oct. 31 letter to Reagan, the senators conveyed their "disappointment" that the soon-to-expire agreement by Nippon Telephone and Telegraph Public Corp. (NTT) to open its $3 billion annual equipment procurements to U.S. bidding has resulted in less than 1% of NTT contracts being awarded to American firms.

The senators said the breakup of the Bell system here will most likely result in Japanese firms obtaining

(Continued on Page 14)

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Speaker Sees New Frontiers for Microprocessor

By Jim Bartimo
CW Staff

CHICAGO — The advent of the integrated circuit and the subsequent development of the microprocessor has brought about changes comparable in significance to the invention of the alphabet, according to William Zachmann, vice-president of corporate research for International Data Corp. (IDC) and a speaker at the Integrated Office Technology Conference and Exposition (Intech '83) here last week.

"You have to go back a millennium to see this type of impact and change," Zachmann said. "For the first time, we're looking at desktop systems that exceed the capabilities of the mainframe," he added, referring to Apple Computer, Inc.'s Lisa and Visicorp's Vision software as examples of this technology.

One reason these capabilities are possible is because "the bandwidth of the connection from the memory to the screen is very much higher than you can get with a mainframe."

CW at Intech '83

Another developing aspect of the microprocessor frontier is the slow phasing out of eight-bit technology, which characterized the first microcomputers.

"The eight-bit computers are already becoming fading photos in the album," Zachmann said. They are being replaced by 16-bit machines not because the size of the address bus is important, but because there is more space available in memory that can be addressed.

Microprocessors will come to the aid of desktops in the form of peripherals and networking chips, he continued. "The new networks will bring a distributed resource system to replace the old distributed data processing," Zachmann said. These networks will bring full connectivity and transmission speeds measured in megabits.

Taking some time out from a session that focused on the impact of the microprocessor, Zachmann gave his personal impression of the IBM PCjr microcomputer which had been officially introduced the previous day.

'Relatively Unexciting'

The prediction that IBM would dominate the home computer market was drastically premature, Zachmann contended. "The PCjr turns out to be a relatively unexciting product — a real ho-hummer," Zachmann said. "It's like an IBM Personal Computer with one arm tied behind its back. That's not much for the money."

In conclusion, Zachmann said the the challenge for the remaining part of the '80s is to close the gap between user and machine. Information systems must be so user-friendly that they are invisible to the user. In turn, users must become familiar with the existing technology.

"The ability to use microcomputer functions will be a requirement in the next decade," according to the IDC vice-president.

DCA Banquet Set for Feb. 23

EL SEGUNDO, Calif. — The Digital Computer Association's (DCA) 32nd annual symposium and banquet will be held here Feb. 23 at the Air Force Systems Command, Los Angeles Air Force Station.

British futurist and author Eric Blair is scheduled to present the keynote speech on "Men, Machines and Media."

He will examine the interrelationships between technology, governments and media and their impact upon civil liberties and individual freedom, according to a DCA spokesman.

R.D. Stone of Symbolics, Inc. will present recollections and collected folk history of the Computer Age, the spokesman said.

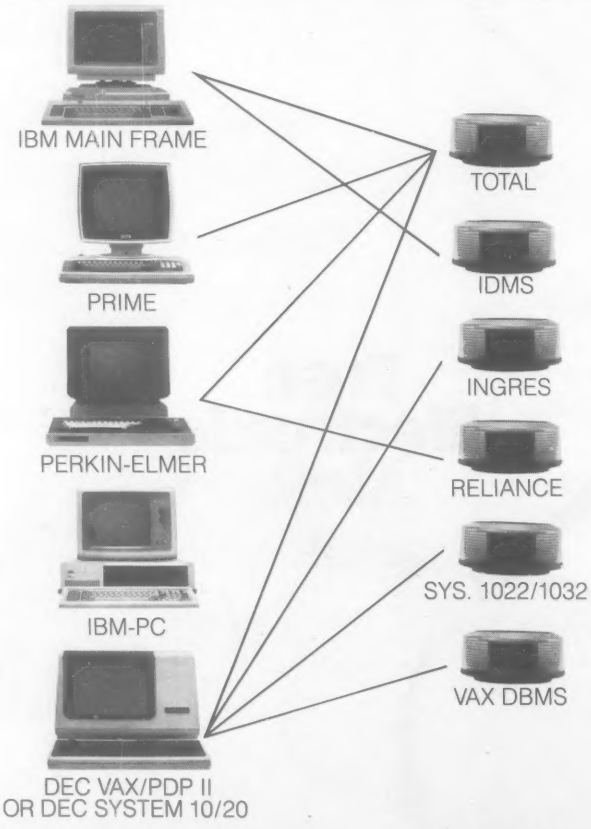
Additional information concerning the symposium is available from DCA, The Rand Corp., located at 1700 Main St., Santa Monica, Calif. 90406.

Washington Update

(Continued from Page 13)

more orders from AT&T and the Bell operating companies than before. Japan, the letter said, exported more than $1.5 billion in equipment last year while importing only $141 million worth.

"While the Japanese have taken some steps to enhance this record," the letter said, "there remains considerable room for improvement." Failure "to secure an effective and fair agreement on telecommunications equipment would have grave consequences for our industry," according to the 15 senators, who added that "failure would likely increase the call for protectionism here at home."



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Keynoter Issues OA Challenge to DP Industry

By Jim Bartimo
CW Staff

CHICAGO — The major challenge facing the computer industry today is to create an integrated office that will answer the needs of end users but not confuse them with new technology.

That challenge was issued here last week by Edmund B. Fitzgerald, president of Northern Telecom, Inc. Delivering the keynote address at the Intech '83 Integrated Office Technology Conference and Exposition, Fitzgerald said, "This is a young industry, in its adolescence. Like any adolescent, we had our first crush — on technology. Now it's time for an adult love affair with the end user."

The computer industry has failed the end user, Fitzgerald contended, because computer technology has often made his job more difficult. "Users are applications-oriented, so the providers of technology must also be applications-oriented," he reminded his audience. "It's time to stop looking at the world through technological glasses."

Fitzgerald said products aimed at end users should meet the specifications of what he called the five C's:

- ***Continuity,*** which gives products an upgrade path and prevents them from becoming obsolete.
- ***Compatibility,*** which allows products to talk to each other.
- ***Congeniality,*** which allows them to be used easily.
- ***Control,*** which allows users to regulate the technology's use.
- ***Cost-effectiveness,*** which allows the business to benefit from the installation of the technology.

CW at Intech '83

Stratus Link, DG Micro Unveiled at Show

(Continued from Page 1)

or from microcomputer spreadsheets.

- SOS/Host, which provides data exchange between IBM Personal Computers attached to a Stratus/32 and converts the output of popular Personal Computer word processing packages.
- SOS/Edit, said to provide Stratus word processing to Ascii terminals attached to a Stratus/32.
- SOS/Xedit, which reportedly allows users of IBM's Xedit text editing package to edit text on IBM 3270s attached to a Stratus/32.
- SOS/Ascii, which allows IBM Personal Computers to emulate Ascii terminals.

A software license for SOS/Exec costs $20,000. SOS/Main costs $5,000, and SOS/Spread is priced at $2,000. SOS/Host is $8,000 for the Stratus/32 and $150 for each Personal Computer, with a minimum order of 10 required.

SOS/Edit costs $3,600. SOS/Ascii is $150 for each Personal Computer, also with a minimum order of 10. SOS/Xedit costs $3,000.

A complete license for the first six software packages is $33,000. Stratus is located at 17 Strathmore Road, Natick, Mass. 01760.

Desktop Eclipse Micro

DG went to Intech '83 to unveil the Eclipse C/30 desktop microcomputer, which it said is compatible with the DG Eclipse family of minicomputers.

Supporting up to 2M bytes of main memory and 150M bytes of disk space, the C/30 includes a hardware floating-point accelerator and fits into DG's Comprehensive Electronic Office system, the company said.

With 512K bytes of memory in an eight-slot chassis, the C/30 is priced at $10,000. Other configurations can cost as much as $33,770 for more features, such as a hard disk and an additional workstation.

More information on the C/30 is available from DG at 4400 Computer Drive, Westboro, Mass. 01581.

Electronic Mail From ADR

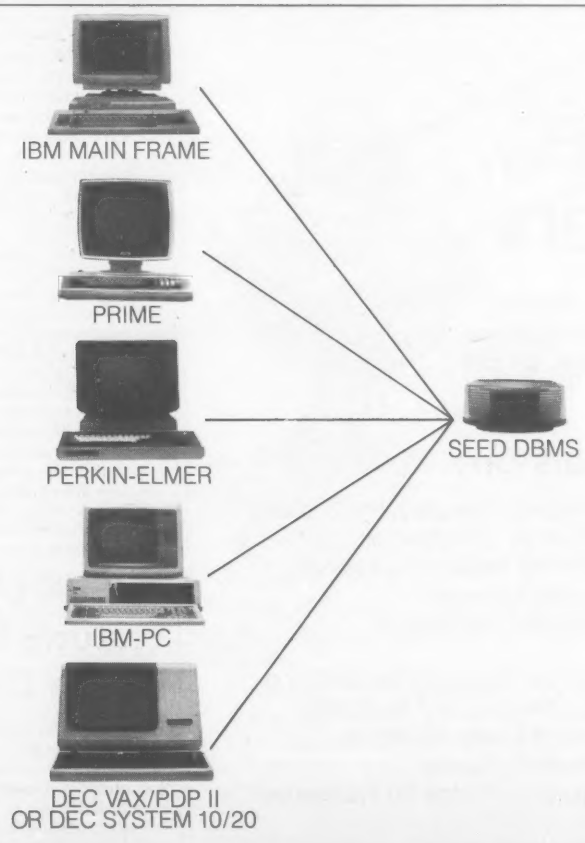
Applied Data Research, Inc. (ADR) announced at Intech '83 that it has enhanced its ADR/E-Mail electronic mail software by adding calendar and scheduling options.

ADR/E-Date is said to provide E-Mail users with an automatic meeting schedule facility, an executive-style daily calendar and the ability to inquire about other users' schedules within specified limits.

Release 1.1 of E-Mail for the IBM 370, 4300 and 30 series of mainframes was also released to allow the integration of the electronic mail package with other mainframe applications such as word processing, ADR said.

The upgraded version of E-Mail starts at $37,500 for OS operating systems and at $18,500 for DOS. The E-Date software will be available in the second quarter of 1984 for $10,000.

ADR's home base is at CN-8, Route 206 & Orchard Road, Princeton, N.J. 08540.



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DP Managers Seen Going Astray With DSS Plans

CW At DPMA

By Bill Laberis
CW Staff

BALTIMORE — The DP department's position with respect to the evolution of decision support systems (DSS) is analogous to the pilot of a wayward jet over the Atlantic — lost but making great time.

That is how Richard P. Bonzagni characterized DP departments' progress to date in meeting the critical challenge of implementing viable DSS. Bonzagni, director of marketing management at Decision Systems, Inc. of Waltham, Mass., analyzed the DSS phenomenon at last week's 32nd Conference of the Data Processing Management Association.

Bonzagni defined DSS as a tool kit that allows end-user professionals to analyze business information directly to make better decisions. Citing data from various studies, Bonzagni said that U.S. expenditures on end-user DP will grow from 1980's $30 billion level to $360 billion by 1990. Much of this growth will be fueled by the microcomputer revolution and proliferation of micro DBMS offerings, as well as by the growing recognition of information as a corporate weapon, he said.

Studies have further borne out that DPers and end users subscribe to similar goals regarding the implementation of DSS, Bonzagni said. However, end users also believe that DP has not done a good job in providing DSS to date.

Bonzagni outlined a plan for acquiring and implementing well-reasoned DSS, a plan mandating the earnest cooperation, guidance and technical assistance of the DP department.

The first step in the process requires making a valid determination of DSS application levels. DP departments should ask for whom the DSS will be implemented and toward what ends, as well as whether the implementation plan is harmonious with overall corporate goals.

Once a preliminary plan has been drafted, with maximum input from both the end user and DP communities, hardware and software must be selected. Both the hardware and software will be different at the various levels of implementation, namely the individual, departmental and corporatewide levels.

On the individual level, Bonzagni said, hardware is optimized for one person's needs, such as a personal computer or terminal tied to an information center. The software library, Bonzagni said, should include general tools, such as Lotus Corp.'s 1-2-3 integrated software or Visicorp's Visicalc financial package.

At the departmental level, hardware and software are optimized for several users doing essentially similar tasks, such as accounting or forecasting, he said. There is an acute need at this level for centralized control of the DSS functions, as there is a need for users to share information on a continuous basis.

There is a corresponding requirement for more computer horsepower to accomplish the data- and logic-sharing applications. Thus, the growing importance of DP's involvement is evident as DSS moves up the corporate hierarchy.

And at the corporate level, hardware and software are optimized for many users doing different functions. Such DSS are generally superminicomputer- or mainframe-based.

The next step in the process, Bonzagni said, is choosing a vendor. In this regard, he suggested, the guide words are experience, support and reputation. Bonzagni said it is wise to choose a vendor with products for which there is plenty of support in the form of a selection of consultants.

"Make sure you take advantage of opportunities to educate potential users," Bonzagni concluded.

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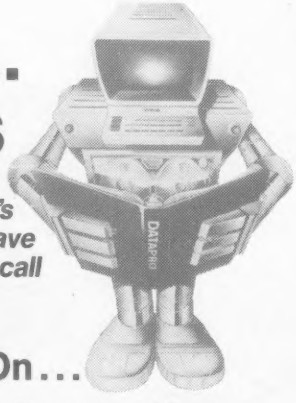

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TRS-80 Desktop Features Hard, Floppy Drives

FORT WORTH, Texas — Radio Shack recently announced the TRS-80 Model 16B, a desktop computer that includes integrated floppy and hard disk drives.

The Model 16B comes with a 1.25M-byte, 8-in. floppy disk drive and a 15M-byte hard disk drive. An external 12M-byte hard disk drive can be added to the system.

The Model 16B package includes the vendor's TRS-Xenix multiuser operating system, which allows up to three people simultaneously to use the Model 16B without loss of performance, Radio Shack said. In addition, files can be shared by all users on the system or restricted to certain users.

Design features of the Model 16B include Zilog, Inc. Z80A and Motorola, Inc. 68000 microprocessors. In addition, the Model 16B features a built-in, user-accessible card cage with four plug-in expansion slots.

The Model 16B with 256K bytes of main memory and 15M bytes of hard disk storage costs $6,999.

Radio Shack is based at 1800 One Tandy Center, Fort Worth, Texas 76102.

But No Application Backlog Cut Seen

Managers See Micros Whetting Users' Appetites

By Bill Laberis
CW Staff

BALTIMORE — Although currently at the bottom of the growth curve, the implementation of microcomputers has whetted end-user appetites for computing power and has stimulated a potentially explosive market.

However, the proliferation of microcomputers throughout the end-user community may not put a dent in the applications backlog, as some DP specialists had hoped. Instead, this proliferation may break the dam of computer phobia for thousands of new users, who will devise new applications.

These were some of the observations gleaned from random interviews with DP managers at last week's 32nd Conference of the Data Processing Management Association (DPMA) here. In all, 10 managers were interviewed, eight of whom worked in organizations where micro proliferation is under way. Of the two remaining organizations, one is working on a policy statement for micro acquisition and the other, a health insurance company, is awaiting the go-ahead from its front office to begin acquiring micros.

Larry Needham, operations manager at Woodwards Stores Ltd. in Vancouver, B.C., said his shop tightly controls and monitors micro acquisition. Woodwards established an information center nine months ago to aid end users, screening requests for micro acquisition and, most importantly, providing much-needed technical support to the growing legions of first-time users.

Everyone Wants Them

Asked who in the Woodwards organization wants a micro, Needham replied, "Just about everybody."

Woodwards' information center recently opened on a walk-in basis, with the result that "it's hard keeping them [end users] away," Needham remarked. The information center, at the behest of DP, limits micro vendors, including IBM, on its list of purchase recommendations. Needham said Woodwards requested 30 IBM PCjrs over two months ago, even though the product was announced only last Tuesday.

"People are gobbling up microcomputing and they are happy," Needham said. "We're watching the process very carefully. But some things are inevitable. They are so darned cheap, and there's so much the users are doing with them."

No Backlog Reduction Seen

But will they reduce the applications backlog? "I don't think so. . . . They just seem to create that many more wish lists."

Linda Jennings, computer services manager at WETA, Washington, D.C.'s, public broadcasting station, concurred. "Once users get comfortable on their micros," she said, "they dream up one application and use after another."

End users at WETA are particularly attracted to word processing and spreadsheet applications. Other applications possibilities "are just beginning to unfold," Jennings said.

As an example of microcomputing's popularity at WETA, Jennings said that a six-user distributed micro system with 10M bytes of disk storage, bought just six months ago, is already at the limit of its storage capabilities.

But Jennings noted that the end users require a great deal of support and assistance initially, support that can come only from the DP department. "Otherwise, they get so intimidated or frustrated that the machine just sits on their desk. . . . They need a certain amount of hand holding, and we are willing to give it to them."

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Kenneth H. Johnson, manager of Enterprise Information Systems (EIS) at Sentry Insurances Corp. in Stevens, Wis., said his shop first studied the need for micros, then set down the ground rules for their acquisition. Like most other managers interviewed, Johnson works at an IBM mainframe shop and therefore placed the IBM line of micros on his recommended-to-purchase list.

"It is important that the micros can interface with our main system, whether or not that ever becomes desirable," Johnson said.

Sentry, too, established an information center to interface with the new cadre of end users. The DP shop has maintained a high level of visibility in the implementation process, ensuring first that those who want micros can demonstrate a need, then shepherding users through the orientation process, according to Johnson.

The information center also conducts periodic "computer concepts classes" to educate those who are largely computer-illiterate to the potential of end-user computing.

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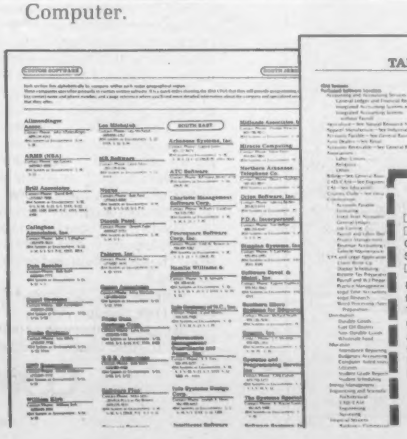

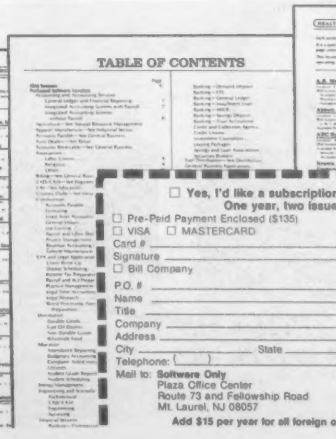
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Managers Grappling With Power Base Erosion

By Bill Laberis
CW Staff

BALTIMORE — What is of concern to the DP manager — employee turnover? The implementation of microcomputers? Staying on top of technological change?

While all of the above are keeping managers on their toes, it was clear at last week's 32nd Conference of the Data Processing Management Association that one concern looms as particularly worrisome to many in the DP community: the erosion of the DP power base.

As highlighted at several seminars at the conference and in one-on-one discussions, the growing sophistication of end users, coupled with a headlong rush into office automation, has fostered a sort of class struggle in some organizations. Computer-savvy end users are tiring of hearing about applications backlogs of 18 months and more. Taking the word processing bull by the horns, they are increasingly implementing and controlling their own systems.

The feeling among end users seems to be that if the DP department won't assist in the process, the DP department be damned.

"Control of the design and implementation phases of application systems is rapidly going from [management information systems (MIS)] to end users, whether or not MIS supports this," said Allan F. Ayers, a management consultant with K.W. Tunnell Co. in Chicago. Ayers led a seminar titled "User Systems: Is MIS Losing Control?"

Ayers outlined a list of issues with which all companies will struggle during the transition to more end-user-based computing, including the

CW At DPMA

maintenance of data integrity and security, the development of effective hardware acquisition strategies and the ongoing provision of technical resources for the new breed of user.

However, the problems encountered during this transition may be grossly exaggerated by personal rather than functional reasons. Simply put, some DP managers view the evolution of end-user computing as a de facto drain on their traditional power base, some end users at the show remarked.

'Heads in the Sand'

Lorne McLachlan, a DPer from the end-user community at Canadian Forest Products in New Westminster, B.C., said that certain divisions within his company developed, hatched and implemented their own office automation systems while DPers "stuck their heads in the sand."

End users at Canadian Forest a few years ago helped sell corporate management on a reorganization of the DP department into the present information services department, dedicated to more end-user computing. The old guard of the DP shop is still running payroll and accounting, but the leading-edge applications have been relegated to the new department, McLachlan explained.

For technical assistance, end users can now go to the manager of user services instead of "beating our heads against the wall with DP," he said.

Further, McLachlan said he was forced to design and implement his own office automation system for his company's building materials division because DP was willing to provide little help. McLachlan settled on a Data General Corp. Comprehensive Electronic Office System, which interfaces with DP's IBM-based system "wherever it's necessary."

"DP could be much more effective if they would just reach out and extend a hand to end users," McLachlan said. "DP managers see it as a threat, but it's really a great opportunity for the technical guys to move up to management. . . . I see a tremendous potential route to the top [for DP] if they just get the users on their side."

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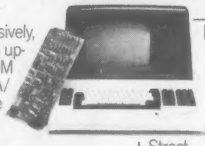

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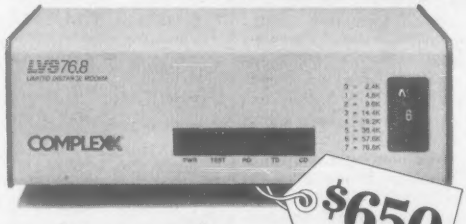

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DP Managers Urged Not to Deify Machines

By Bill Laberis
CW Staff

BALTIMORE — A few words to DP managers on the dawning of the Era of Artificial Intelligence (AI): However "intelligent," a computer is not human, and however efficient, a human is not a machine.

Thus, as AI enables computer systems to function as more autonomous information gatherers and processors, managers must fight the human tendency to deify their machines, while respecting the fallibility of their staff.

That was the crux of the message delivered by author Joseph Deken, who keynoted the 32nd Conference of the Data Processing Management Association here last week.

Deken — Ph.D. holder, university professor, former Green Beret and author of the best seller *The Electronic Cottage* — cautioned further that the AI era will provoke major changes in the fundamental duties of DP managers.

No longer will DP managers hold the system keys exclusively while directing the efforts of their programmers. Rather, great advances in distributed processing will give individual programmers their own set of system keys, making the primary duty of the DP chief "manager of managers."

No longer will programmers be writing only human-to-machine interfaces, Deken added. "Artificial intelligence will increasingly make computers [the] vehicles for people to communicate with people. . . . The programmer will simply write documentation, and the computer will write the programs for the end users," he said.

CW at DPMA

Therefore, the focus of the "new" DP manager will be one entirely based on facilitating communications between programmers and the systems with which they work, Deken asserted.

This situation is viewed as both a challenge and a threat, he noted. Some managers will become infected by what Deken termed "rash anthropomorphism," attaching superhuman attributes to a machine because of startling developments in microcircuitry and natural language programming.

Deken referred to a program dubbed "Eliza" that uses key-word techniques in the computerized application of Rogerian psychotherapy. Calling these applications "trick programs," Deken said they are designed primarily to show us that we had better not accept AI unseen and assume that because computers suddenly start taking on characteristics of human intelligence that we ought to start thinking of them as human beings.

DPMA Cites Educator

BALTIMORE — Tne founder of one of the nation's first proprietary schools specializing in computer automation was the recipient of the Distinguished Information Sciences Award in ceremonies at last week's 32nd Conference of the Data Processing Management Association (DPMA) here.

Paul M. Pair, 69, was cited for his pioneering role in offering quality DP education in a way that served as a model for other DP educators.

From an early career in public school education in Kansas, Pair moved to the private business school arena, serving as director of Gregg College in Chicago and later founding the Pair School of Business. Hearing about automation for the first time in the early '50s, Pair said he "spent one year studying this trend and decided I'd bet my future on it."

In 1957, Pair founded the Automation Institute of Chicago, later allying himself with Control Data Corp. Institutes of Control Data Corp.

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AT&T's Brown Looks to 'Intercommunication'

By Phil Hirsch
CW Washington Bureau

GENEVA — "Intercommunication among an increasingly diverse array of products, services and systems" is one of the major challenges confronting telecommunications vendors and policymakers, AT&T Board Chairman Charles L. Brown said here recently.

Speaking at Telecom '83, an international telecommunications conference and exhibit, Brown also called for closing the "communications gap" between such countries as the U.S., where "more than eight million people use video display terminals daily," and those countries where people lack access to basic voice telecommunications services.

Underlying Brown's address was the idea that the opportunities created by advances in communications technology will not be realized in most countries until "intercommunication standards" are developed. The telephone has become an information terminal, the TV set an interactive communications device and the private automatic branch exchange an office management system, he pointed out.

But standardization does not require total uniformity, Brown said. "What we do need is agreement on fundamental standards that will maximize the ability of users to communicate effectively and efficiently."

Brown pointed to current international efforts to develop standards for integrated services digital networks (ISDN) as "one of the most crucial and promising" steps toward achieving intercommunication. The ISDN standards development shows how fundamental concepts, once agreed upon, can be implemented in a variety of ways by different countries, Brown said.

The conference, which began Oct. 26 and ended last week, is held every four years by the International Telecommunications Union. Telecom '83 officials expected an attendance of 50,000 by the end of the seven-day event.

Some attendees commuted from cities in France and West Germany that are more than 100 miles from Geneva.

The exhibit of telecommunications products that runs with the show filled a cavernous two-level convention center. Approximately 160 countries, ranging from the U.S. and France to China and Saudi Arabia, were represented at the exhibit.

Bill Revising FCC Surcharge Goes to House

WASHINGTON, D.C. — Legislation that could significantly raise large companies' communications costs awaited final action in the U.S. House of Representatives last week after being passed by the House Commerce Committee. Floor action on the House bill, H.R. 4102, is believed likely within the next two weeks.

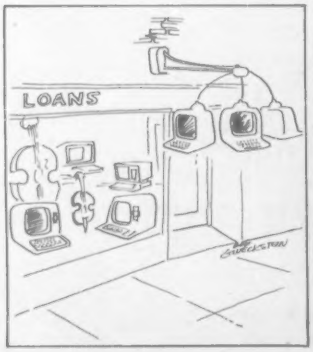
The Senate may act soon afterward on a similar measure, S. 1660.

Both the House and Senate bills would drastically revise the surcharge that the Federal Communications Commission (FCC) wants to impose beginning Jan. 1 on business and residential users of the long-distance telephone network. These surcharges, plus usage charges imposed directly on interstate carriers but paid by their customers, were designed to reimburse local telephone companies for the costs of providing access to the long-distance network.

The new charges would replace the "separations/settlements process," which historically has reimbursed local telephone companies for long-distance access and supplied about 25% of their revenues. Fees received by local telephone companies under this arrangement have been paid solely by long-distance users through charges levied by intercity communications carriers.

The FCC's new access charge plan, as originally proposed, imposed a flat charge of $2/mo per line on residential subscribers and up to $6/mo per line on business users. The former charge would total about $1.9 billion next year and the latter about $1.5 billion, according to a House Commerce Committee estimate.

If the pending legislation is enacted, all of this "revenue requirement" would have to come from other sources — for example, from higher monthly surcharges on larger business users and/or higher rates for long-distance services used by business and residential customers.



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The Suit, Bob Bernard (right) and The Chip, Nick Pisarro (second from right) co-founded Canaan Computer Corporation in 1981.

To Meet Challenge of Automation

Union Changes Urged to Attract Service Sector

By Patricia Keefe
CW Staff

GAINESVILLE, Fla. — The spiraling growth of automation requires a new form of unionism that can organize and effectively represent service-sector workers, according to an assistant professor of business at the University of Florida here.

To win over service-sector workers, including clerical, white-collar and high-tech employees, the professor, Luis Gomez-Mejia, and other labor experts suggest that unions:

- Grant management more freedom in decisions concerning promotions, work assignments and pay.
- Stress other benefits besides security and seniority rights, such as professionalism, product quality, education and advancement opportunities.

Most professionals value autonomy and the concept of achievement, Gomez-Mejia said in a recent interview. High-tech employees, whether categorized as professionals or as assembly-line workers, reportedly tend not to be pro-union, fearing a decline in quality when unions come in.

The biggest obstacle facing unions in their bid to organize the service sector is an attitude among this pool of potential recruits that they can do better without a union, Gomez-Mejia said. High-tech workers, who have a reputation for job hopping every two to three years, provide prime examples of personnel with this attitude.

'Although the AT&T strike this summer "proved that computers make pretty effective scabs," it also proved that unions are moving in the right direction by actively recruiting from the service sector. . . . Most businesses can stand it if support personnel go on strike, but not if their top-level people go out, too.'

Gomez-Mejia expects this situation to continue for another 10 years until the high-tech industry stabilizes and attains maturity. When this happens, work will not be so plentiful, and workers will no longer be able to jump from job to job in search of the perfect blend of job opportunities and liberal benefits.

Faced with the possibility of investing a significant portion of their career in one company, high-tech workers will become more open to what unions have to offer, Gomez-Mejia said.

"As long as it's easy to find a job elsewhere, people feel unions will hurt them," he said.

Although it will be another 20 to 50 years before computers make the strike worthless, computers are moving in — restructuring the work place and replacing workers in their wake, the professor said. As a result, "the nature of unions is changing in response to automation."

Although the AT&T strike this summer "proved that computers make pretty effective scabs," it also proved that unions are moving in the right direction by actively recruiting from the service sector, Gomez-Mejia said. Most businesses can stand it if support personnel go on strike, but not if their top-level people go out, too, he explained.

Traditionally, unions have gained power from large memberships, which give them more leverage in contract negotiations. But union membership today represents less than 19% of the work force compared with 25% in 1955, according to Gomez-Mejia.

"Unions have been hurt by the fact that employment has been growing faster in the less unionized service sector than in the heavily unionized sectors," he observed.

Possible Recruits

To counter this trend and beef up their ranks, some unions have been looking toward the service sector for possible recruits. For example, the Teamsters union is attempting to organize clerical workers.

In another move to modernize for the computer age and to expand their power bases, several unions have merged, Gomez-Mejia said. The American Federation of Teachers recently joined the American Federation of Labor/Congress of Industrial Organizations.

However, unions will not find change easy, Gomez-Mejia warned. In addition to the computerization of job functions, many of the basic union functions are being supplanted by federal statutes and by companies that are offering benefits and safeguards traditionally provided by unions, he said.

As a result, some labor experts relate the diminishing power of unions to their own success in improving the work place.

"There's no question about it. Over the last 30 years, American business has invested a significant amount of money in human resources. Companies are getting smart," Gomez-Mejia added.

productivity-boosting functions that are offered by the new high performance workstations."

"For certain segments of a corporation," continued the Suit, "those who do only simple editing and inquiry, or those who do non-interactive batch processing, the present equipment is perfectly fine. Call them mainframe-satisfied! But for a large group, some 35 percent of the users, the multi-user mainframe just can't provide the kind of one-on-one, productivity-building capabilities that are proving so fruitful today."

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"Plus, it provides multi-window very high-resolution graphics, concurrent processing, the Ethernet networking—and," the Chip paused for a breath, "the company using VM/CMS applications doesn't have to do a thing to its present body of data."

"Except call us for some of ours," added the Suit. Call (203) 374-5592. Or write Canaan Computer Corporation, 39 Lindeman Drive, Trumbull, Connecticut 06611.

CANAAN

CAT Scanning Unwraps Mysteries of Mummies

By John Gallant
CW Staff

ST. PAUL, Minn. — With an eye toward making computerized axial tomography (CAT) scanning as much a tool of the archaeologist as the pith helmet and the shovel, two doctors here are using that powerful technology to unravel mysteries hidden for centuries in ancient mummies.

According to Dr. Derek Notman, resident in radiology at the University of Minnesota Hospitals and chief of the research project, CAT scanning, which links X-ray imaging with minicomputer technology to provide two-dimensional, cross-section views of the body, may soon become standard equipment for Egyptologists. Notman has already used the technique, which he said is more commonly known as computed tomography (CT) scanning, on two mummies and plans to apply the technology to several more in the near future.

CT scanning "is particularly useful for viewing Egyptian remains encased within linen or coffins," Notman said, whose undergraduate background in physical anthropology and archaeology led to his interest in mummies. "Regular X-rays give overlaying shadows that obstruct detail, but CT scanning paints a clear anatomical picture for you."

Some Insights

In May the first mummy viewed under the CT equipment offered some new insights to researchers. "We found with the first mummy a number of abnormalities. There was, for example, extensive evidence of bone disease that had not appeared on the regular X-rays," Notman said. "This showed us the advantages of using the CT scan to capture information that escapes standard X-rays."

The most recent focus of Notman's research was what was thought to be the remains of a 35-year-old male priest known as the Nameless Mummy, who died approximately 3,500 years ago during Egypt's 18th dynasty. While the results of the CT scanning produced no real surprises, the 200 images taken at one-centimeter intervals along the length of the mummy offered new evidence to support existing theories.

"We were able to see very clearly the internal details of the mummification process," said Dr. Orrin Shane, curator of archaeology at the Science Museum of Minnesota, where the Nameless Mummy is housed. "For example, the images clearly showed a fracture of the septum caused by the insertion of a long tube. That tube, with a hook-like appendage, was used to scoop the brain out. We were familiar with that process, but the scan showed it very clearly."

Method of Wrapping

The scan also showed "in great detail the method of wrapping. You could see the many levels of linen used," Shane said. "By taking the computer-integrated slices, you are able to clarify the internal view," he said.

"We're very pleased with the results," he added. "The detail is far greater than that obtained with flat X-rays."

The equipment used most recently by Notman is a third-generation General Electric Co. Model 8800 CT scanner valued at about $1.2 million. According to Notman, the GE equipment issues an arc of X-ray beams, which passes through the body to an array of collectors beneath, scanning a full 360° at increments chosen by the research team. The X-ray data is then automatically digitized and relayed to the minicomputer, which processes the information and outputs the results as hard copy or on a CRT.

Notman, whose research was funded by a grant from the hospital's radiology department, plans to publish the results of his work to encourage more widespread use of CT scanning in studying ancient remains. "Eventually, I hope to have the chance to use the CT technology on other mummies housed overseas," he said in a recent interview. "This work is important from both an archaeological and a pathological viewpoint."

Shane is currently developing an exhibit at the museum based on the CT scan images.

Compec '83 to Feature 500 Exhibitors

LONDON — The Computer Peripherals, Small Computers and Systems Exhibition (Compec '83) will feature 500 exhibitors and 12,000 square meters of exhibit space when it opens here Nov. 15.

Organized by Reed Exhibitions and sponsored by several English computer magazines, the event will be held at the Olympia exhibition halls and will feature vendors from countries that include the UK, U.S., Japan, Norway, Sweden, Netherlands, Poland, West Germany, Canada and Italy.

Among vendors exhibiting new equipment will be Acorn Computers Ltd., Research Machine Ltd., Sinclair Research Ltd., GEC Computers Ltd. and Ferranti Computer Systems Ltd.

More information on the exhibition can be obtained from the British Information Services, 845 Third Ave., New York, N.Y. 10022.

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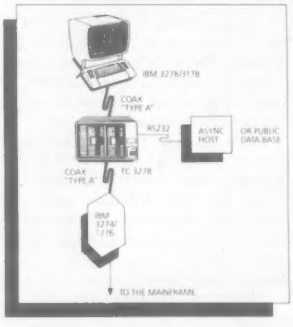

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COMPUTERWORLD
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End Users
10 Manufacturer (other than computer)
20 Finance/Insurance/Real Estate
30 Medicine/Law/Education
40 Wholesale/Retail Trade
50 Business Service (except DP)
60 Government—State/Federal/Local
65 Public Utility/Communication Systems/ Transportation
70 Mining/Construction/Petroleum/Refining
75 Other User

Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/ Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/ Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

Provides a Better Fit for Prostheses

CAD/CAM System Giving Bioengineers a Hand

By John Gallant
CW Staff

NEW YORK — Biomechanical engineers at the Hospital for Special Surgery here are using an innovative computer-aided design and manufacturing (CAD/CAM) system to give surgeons a hand . . . or a foot . . . or a leg . . .

With the help of the $3.4 million CAD/CAM system, researchers have adapted industry techniques to model and produce artificial human joints such as hips, legs and arms. The use of CAD/CAM has led to improved quality of customized implants, increased comfort for prosthesis patients and a reduced need for surgeons to modify a patient's bone structure during the implant operation, according to biomechanical engineer Robert Paxson.

Paxson said engineers at the hospital's Biomechanics Department use patient X-rays to obtain limb measurement data that is entered into a McDonnell-Douglas Automation Co. (McAuto) Model D/100M graphics terminal driven by a Digital Equipment Corp. VAX-11/750 supermini. The CAD/CAM system, which was funded by Johnson and Johnson Products, Inc., utilizes McAuto's Unigraphics interactive graphics system software.

Using the X-ray data, a biomedical engineer can produce on the graphics terminal a rough sketch of the particular prosthesis needed. That sketch is then modified to design an exact-fitting implant on screen.

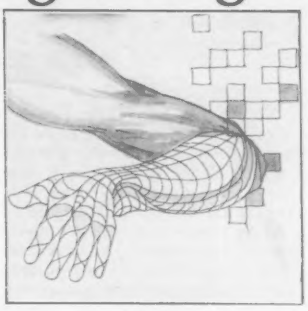
With support from a special machining module of the Unigraphics package, the design data is then transferred to paper tape, which drives the numerically controlled manufacturing machines that actually sculpt the joint from polyethylene.

In the past, each artificial implant had to be measured and manufactured by hand, a process that was not only a time-consuming process but also forced surgeons to do much of the actual prosthesis fitting while the patient was on the operating table. Because the CAD/CAM-designed joints are more accurately fitted, they require less surgical time to implant and wear out less quickly, Paxson said.

"Essentially, surgeons used to just choose from a variety of catalog items," he noted. "The goal of this program is to reduce the cost of providing prostheses and to reduce the waiting period from the time a surgeon determines a prosthesis is needed to the surgery date. We have also been able to improve the fit and comfort for each patient."

In conjunction with researchers at Cornell University in Ithaca, N.Y., the Special Surgery staff is also working to develop what Paxson called the Computer-Assisted Prosthesis Selection (Caps) system. The Caps system, which Paxson said could be in place by early 1984, will provide surgeons with a data base of standard implant designs that can be quickly modified for a particular patient.

"Caps will be designed as a computer program using dynamic graphical images that will allow surgeons to enter X-ray data and patient parameters, such as height, weight and age, and the system will select the best fitting prosthesis. Then the surgeon can test-fit that prosthesis on screen," Paxson said. "It will relieve biomechanical engineers of the necessity of custom designing each implant."



As surgeons become familiar with the hospital's CAD/CAM project, Paxson said, the techniques will become more widely used. "This technique allows quick and easy modifications to produce a better fitting prosthesis. I think hospitals will come to rely on this more and more in the future."

Directory Details Programmer's Mart

CINCINNATI — Writer's Digest Books has made available a new directory called the "1984 Programmer's Market" that lists over 500 software publishers, arcade game publishers and magazines.

The directory also gives information on submission requirements, royalty/payment terms, available contract work, tips from buyers on selling software and tips on how to prepare a query letter.

The directory will be updated and issued annually. Priced at $16.95, it is available from Writer's Digest Books, 9933 Alliance Road, Cincinnati, Ohio 45242.

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International Report

FROM THE CW INTERNATIONAL NEWS NETWORK

AUSTRALIA

MELBOURNE — In a series of moves said to be worth about $91 million to the Australian economy over the next five years, IBM Australia Ltd. has laid plans to develop both hardware and software in Australia, winning federal offset credits and government kudos. IBM will reportedly convert its Selectric typewriter plant in Victoria to assemble and test its Personal Computer product line.

MELBOURNE — Australia will host the inaugural Pan-Pacific Computer Conference in August 1985. The conference will be a biennial event coordinated by Australia and the U.S. and will rotate between Southeast Asian cities.

CHINA

BEIJING — A relational data base management system for the IBM Personal Computer has been unveiled here by Hefei Polytechnical University. The relational DBMS runs under Digital Research, Inc.'s CP/M 86 operating system and adopts a hierarchical architecture, a spokesman said. A data dictionary is reportedly built into the data base management system to guarantee data independence; a self-reliant query language is incorporated for nontechnical users.

BEIJING — The Chinese Institute of Scientific and Technical Information has established an agency to retrieve on-line information from the European Space Agency's Information Retrieval System (ESA-IRS). Known as the International On-line Information Retrieval Services Office, the agency will tap the ESA-IRS via the Itali public data communications network. In addition to this, plans are under way to extend the service to handle on-line information retrieval from the U.S.-based Lockheed Corp. Dialog system via European and American data communications networks at the end of this year.

ITALY

MILAN — In celebration of its 75th anniversary, Carlo Olivetti, Inc., Italy's premiere computer maker and second in the European marketplace only to IBM, has organized, sponsored and partially restored a 20-work collection of Leonardo da Vinci. The collection of masterpieces will leave here on Nov. 27 and tour museums in Washington, D.C., Sidney, Australia, Toronto and Amsterdam.

JAPAN

TOKYO — IBM Japan Ltd. announced that its Multistation 5550 — the Japanese version of the IBM Personal Computer — has the added capability of functioning as an IBM 3270 Personal Computer. Users can reportedly choose to use the 5550 as both a 3270-PC or as a dumb terminal just by pressing a button called the "hot key." A spokesman said users can exchange files between the 5550 and host system and can communicate either by cluster or single-station method. Present IBM 5550 users can obtain the function of the 3270-PC as of September 1984 at a cost of $745 for the hardware and $319 for the software.

TOKYO — Over 134,000 attendees and 29 vendors were at Data Show '83, Japan's largest annual computer show, which was held here Oct. 18-21. The big attractions at the show were workstations equipped with mouse interfaces, graphics, Japanese word processors and local-area networks. Data Show '84 is set for Sept. 26-29.

TOKYO — Six major Japanese computer vendors reported very healthy sales figures for the first half of fiscal 1983 (April 1 to Sept. 30). Fujitsu Ltd. topped the list with computer equipment sales garnering $12 million, up 22.4% from the same period last year. Nippon Electric Co. Ltd.'s sales were valued at $8.9 million, up 29% from last year; Hitachi Ltd. had sales of $8.3 million, up 26%; and Toshiba Corp. had sales of $3.3 million, an increase of 47.4% from the same six-month period last year. OKI Electric Industry Co. Ltd.'s sales reached $2.9 million, a 21% hike from last year, and Mitsubishi Electric Corp. sold $2.08 million worth of computers, showing an increase of 20%.

YOKOHAMA — Seiyu Stores, the third-largest supermarket chain in Japan, opened an experimental grocery store based on computer-aided sales and service technology. The store is electronically automated in nearly all respects. The loading, unloading and storage of products are fully automated and handled by robots and conveyers. The lights, air refrigeration, security, germ-free kitchen, robots and conveyers are all remotely controlled at the company's Total Control Center facility, which is located at another store. The communications between the two are handled via fiber-optic communications. In addition to these features, the store features an "Information Salon," where shoppers can tap into an electronic recipe and visual cooking information data file with the help of a Nippon Electric Co. Ltd. personal computer system and a video disk system produced by Fujitsu Ltd.

SWEDEN

STOCKHOLM — While the advent of optical computers is not expected to occur until the 1990s, a researcher at the Swedish Institute for Microwave Technology named Bjorn Broberg believes the individual components exist now for optical computers. Observing that every telephone company in the world is buying fiber-optic systems, Broberg recently contended that these wires will reach inside the computer before long. According to Broberg, the logic will remain electronic, but communications inside the computer will proceed along fiber-optic cables, achieving higher speed and reliability while lowering the power consumption. The principle Broberg promotes is to use different wavelengths for different communications channels inside the same optical cable. The new patented devices will eventually be manufactured by the Swedish electronics firm Rifa, which is already making galium arsenide devices for fiber-optic cable networks.

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Sessions to Target Management

Micro Forum Slated for Nov. 30

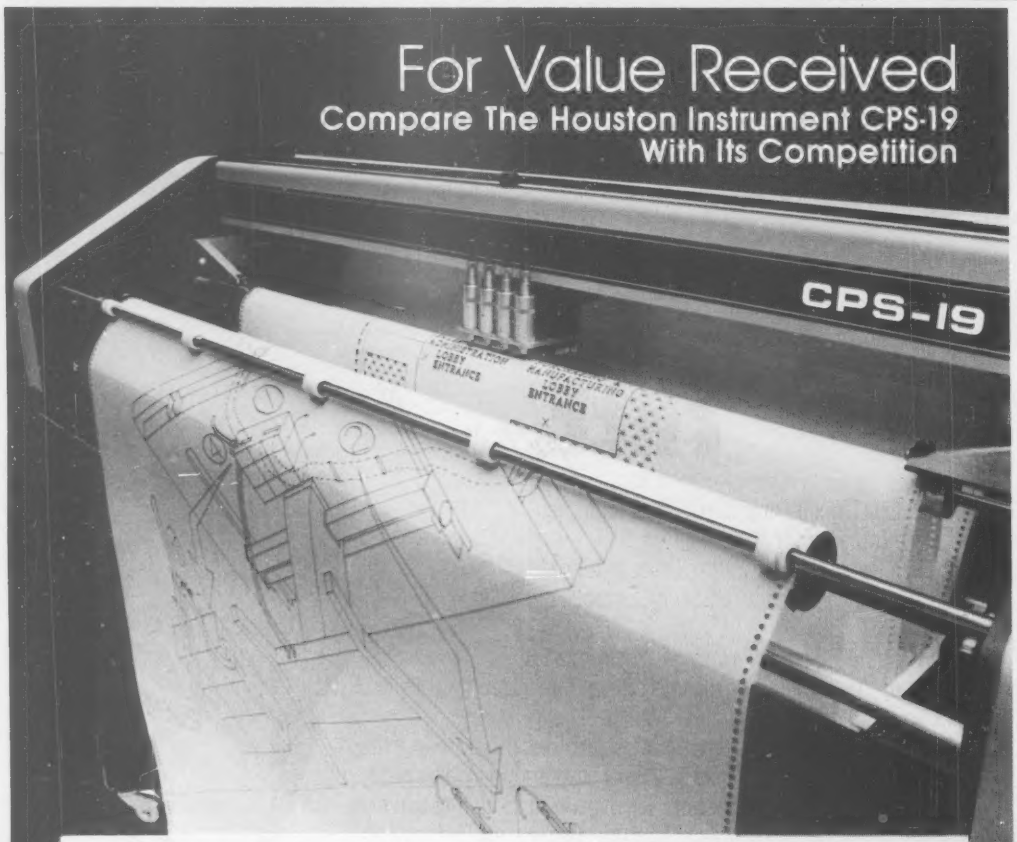
WASHINGTON, D.C. — "Managing Microcomputer Systems: Integrating Personal Computers into the Organization's Operating Environment" will be the topic of a Systems Executive Forum sponsored by the George Washington University School of Government and Business Administration here Nov. 30-Dec. 2.

The three-day forum will feature sessions on top management perspectives on microcomputer usage, decision support system applications, policy approaches to micro acquisition and information center implementation.

The forums will also include two full-day briefings on leading systems and strategic planning for mainframes and micros.

Speakers will include Dr. Norma Maine Loeser of George Washington University; Raymond S. Jozwik of Peat, Marwick, Mitchell & Co.; Al Iagnemmo of Federal ADP Users Group; and Alan Paller of AUI Data Graphics.

Registration for the conference is $535 for the executive forum only and $295 for the executive briefing only. The cost of attending both is $745. More information is available from Managing Microcomputers, Department K, 1805 Powder Mill Road, Silver Spring, Md. 20903.



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Office Efficiency Analyzed in Book Produced by IMC

WASHINGTON, D.C. — The International Information Management Congress (IMC) has made available a new book titled *Office Automation*. The publication reportedly depicts how mechanization, automation and people can fit together to achieve greater efficiency in performing office work.

The book covers the "principles involved in analyzing and designing office information systems," IMC said, and combines basic computer concepts with an examination of the "people factors" involved in introducing mechanization and automation into offices.

Published by John Wiley & Sons, the 336-page book is priced at $36 from IMC, Publications Sales, Box 34404, Bethesda, Md. 20817.

Guide on Robots, CAD/CAM Out

ROCKAWAY, N.J. — Technical Data Publishing Corp. has published the "Robotics-CAD/CAM [computer-aided design and manufacturing] Directory," the first in a series of technical- and specification-oriented directories.

The first edition includes sections titled "Robots," "CAD/CAM," "Sensors," "Vision and Automated Inspection Systems," "Products and Services Index," "Consultants, Distributors and Representatives" and a glossary of terms associated with these industries.

Each section gives photographs and specifications on the complete system and/or products in that particular category, according to the publisher.

The price of the directory is $30 (U.S.), $40 (Canada) or $50 (foreign). Further information is available from Technical Data Publishing, located at 53 Lake Shore Drive, Rockaway, N.J. 07866.

Managers on the Move

ROBERT V. RICHARDS, formerly director of information systems, has been promoted to the newly created position of vice-president of information systems for The Nestle Co., Inc. in White Plains, N.Y.

Richards, who joined Nestle in September 1982, is responsible for information systems, telecommunications and office automation.

He previously worked for Philip Morris, Inc., where he was director of management information systems. He relocated to New York from Richmond, Va., where he had been director of systems development for Philip Morris USA since 1975.

Prior to his seven-year post with Philip Morris, Richards was director of corporations systems at Lowenstein, Inc. in Rock Hill, S.C., between 1965 and 1975.

He received his degree in industrial engineering from Purdue University, West Lafayette, Ind., in 1962.

• • •

RICHARD D. REINBEAU has been promoted to director of information systems for Associates Bancorp, Inc. in South Bend, Ind., a subsidiary of the Associates Corp. of North America (The Associates). He will direct the efforts of personnel in developing and maintaining computer systems for The Associates' Commercial and Diversified Services subsidiaries.

Reinbeau joined The Associates in July 1978 as a senior systems analyst and subsequently served as a team leader and manager of information systems. His prior professional experience includes 11 years as senior processing analyst with Xerox Corp. in Rochester, N.Y., and four years as a control supervisor with Ralston Purina Co. in Pittsburgh, Pa.

He has a bachelor's degree in accounting from Duquesne University, Pittsburgh.

Robert V. Richards

Vsam Course Updated

BELLEVUE, Wash. — Software Information Services, Inc. has announced that its "MVS Vsam for Systems Programmers" course has been updated to include coverage of the Data Facility/Extended Function program that replaces Vsam catalogs with Interactive Communication Feature (ICF) catalogs.

Developed for anyone who maintains a Vsam environment, the four-day course is said to feature lectures and exercises covering all aspects of ICF catalogs, Vsam file performance tuning and the new Vsam functions available with the Data Facility/Data Set Services program.

The course can be presented on-site for $3,800 plus expenses. The cost to attend a public presentation is $400 per person. A course outline is available through Software Information Services, P.O. Box 4132, Bellevue, Wash. 98009.

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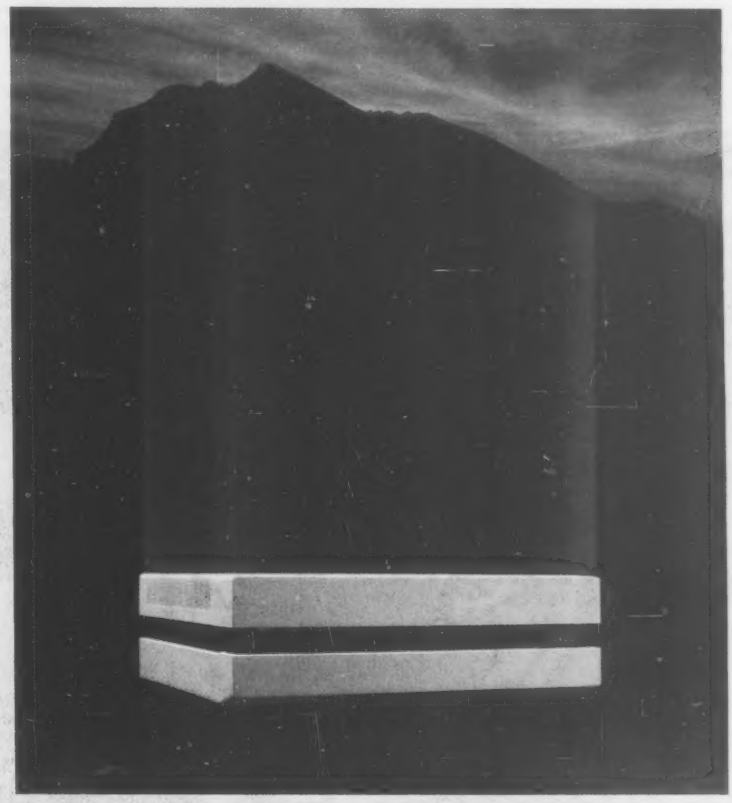

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To Offer Remote Clients Better Access

Data Provider Links Micros to Mainframe Site

PRINCETON, N.J. — When Sage Data Corp. began looking for a way to offer its remote computing clients better access to its data bases and software, the company saw the linking of microcomputers to the mainframe environment as an opportunity rather than a threat.

Sage provides economists, researchers and corporate planners with proprietary historical and forecast data bases, analytical and presentation software and economic and DP consulting. The core of the firm's services is the Sage System, a query-driven support package designed to provide an environment for econometric modeling and analysis.

Sage already offered the system through time-sharing and in-house VM/CMS installation. The firm, however, was looking for a way to advance its distributed processing strategy by offering a micro communications and data transfer link.

"The microcomputer is playing an increasingly important role in the executive work place," Sage President John Torkelsen said. "But for the type of advanced processing, data base management, analytical and graphics capabilities our clients need, you have to have a mainframe. It's critical for our clients to have this information at their fingertips for inclusion in micro-generated reports, and we needed a way to provide that."

The problem Torkelsen discovered was that most software packages that promised to provide the capability to upload and download data files between mainframe and micro were good only for specific applications. After a lengthy review, he could find only one package that offered the capabilities Sage needed.

Torkelsen chose a combination of the Please and Relay communications software packages developed by VM Personal Computing, Inc. of New York. Please software, designed for the VM/CMS environment and used in conjunction with the Relay package for the IBM Personal Computer, provided for the uploading and downloading of data between the Personal Computer and the mainframe.

As a tool to transform the microcomputer into an executive workstation for Sage clients, Torkelsen said the package is "very successful. So far it's done just what they said it would."

Please/Relay Package

Torkelsen said that, in addition to allowing users to download data for inclusion in micro-based reports or spreadsheets, the Please/Relay package has enabled clients to download files and use them off-line, a capability that has resulted in a significant reduction in on-line charges in many cases. The ability to upload files to the mainframe has helped maintain data integrity, allowing users to store files locally and submit them only for analysis or interpretation.

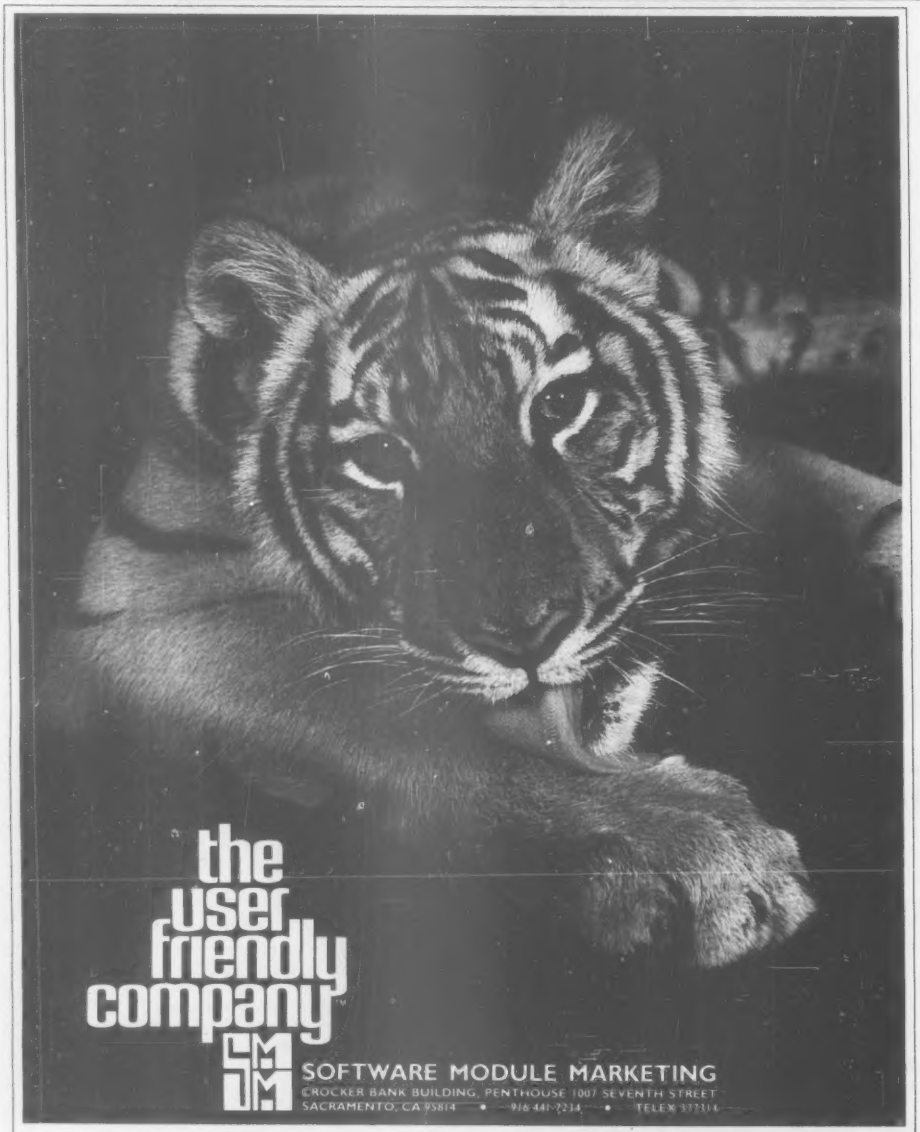
The Please/Relay combination, according to Torkelsen, has also given clients the ability to create their own commands for applications performed repetitively on the Sage System. Additionally, users can incorporate data from other data bases into the system through the Personal Computer

But, Torkelsen said, the most important aspect of the newly developed micro-mainframe link is the capability for users to download Sage's graphics generation files, including command and control characters, to perform graphics generation off-line.

"Before, if there was a line-hit or other noise in the middle of a graphics transmission, it would cause havoc," Torkelsen said. "Now, rather than put the graphics on-line, we send the commands to the Personal Computer disk-file so it can be plotted off-line.

"Also, having the graphics file on the micro allows integration into other application packages and the generation of multiple copies," he said.

The Please/Relay combination has also allowed the Sage System to accommodate either text or data files of any length or format. The files can be micro-based, such as spreadsheets, or mainframe-based, such as systems files or modules. Files can be transfered with or without conversion between the Ascii format used by the Personal Computer and the Ebcdic format utilized by CMS.



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Package Greases MRP for Oil Tools Company

HOUSTON — The in-house project team at Baker Packers knew exactly what it was looking for to improve the firm's existing manufacturing resource planning system: the ability to integrate multiplant planning and improved computer processing time.

Unfortunately, the team discovered that Baker Packers, a division of Baker Oil Tools, Inc., would have to spend about $1 million if the existing library of 800 application programs that accessed the manufacturing data base had to be converted to a new data base format.

The company, which manufactures tools used in petroleum production, had based those programs on what Donald Floehr, management information systems director, described as a "vintage 1960s material requirements planning [MRP] package that was part of the old DOS operating system on our IBM 3033 processor."

"We needed a new manufacturing resource planning package," Floehr said, "because we had embarked on a plan to become a Class A [advanced MRP] company. We were attempting to improve our inventory accuracy and implement a new master scheduling and forecasting system.

"But, most of the vendors we looked at required that we change our data set format to use their programs," Floehr continued.

No Format Conversion

The project team requested responses from a number of software suppliers, specifying that the vendor's software had to use the existing data base without a costly format conversion.

Also, because Baker Packers' existing system required that MRP reports be processed individually for each of the firm's four plants in three states — a procedure that took up to 36 hours of computer time — the team wanted a package with the ability to integrate multiplant planning.

Only two vendors responded to Baker Packers' queries.

One vendor offered to reformat its own internal data base at a cost of $1 million, exactly what the project team had predicted it would cost Baker Packers to convert its programs.

The second vendor, Applied Information Development, Inc. (AID) of Oak Brook, Ill., offered what it called its "data base independent" software, AID-MCS, which was priced at less than $200,000.

Test Package

To test the capabilities of the AID-MCS package, the Baker Packers project team put together an acceptance test package comprised of engineered test data, test data base files and engineered results that defined the existing format and what results the company expected from the AID package. AID personnel then developed an extract routine, which was designed to draw data from the existing data base and reformat it to the AID-MCS package's internal routine.

The extracted data could then be processed by AID-MCS, converted into the old format and reloaded to the data base.

The project team set up more than 400 test cases, which were executed and evaluated before the software was accepted for installation.

In the first year of use, Baker Packers encountered only a small number of minor problems, all of which were corrected either by warranty work or with minor enhancements to the AID-MCS package.

With the AID package, Baker Packers now processes MRP reports for all four plants simultaneously — a procedure that involves more than 45,000 inventory items — in only 10 hours.

Each week when the firm processes its MRP reports, the AID-developed extract routine draws data from Baker Packers' manufacturing data base, reformats and processes the data with the AID-MCS package and reloads that information into the manufacturing data base once again.

That data can then be utilized with the firm's existing applications programs.

Baker Packers initially installed the MRP module of AID-MCS and later the Master Production Scheduling subsystem.

The company also plans to add the Distribution Requirements Planning module of AID-MCS.

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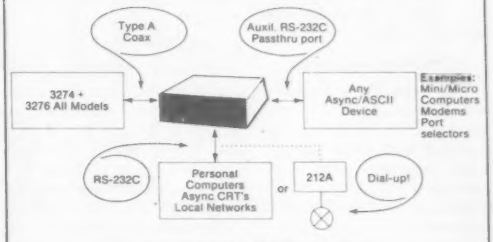

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Mini Processes, Tracks Ticket Sales, Trims Lines for Basketball Fans

COLUMBIA, S.C. — When varsity basketball tickets went on sale this fall at the University of South Carolina (USC), fans of the "Fighting Gamecocks" did not have to wait in long lines, for a change.

That's because ticket office clerks here are using a newly installed IBM minicomputer and workstation this season to keep track of ticket sales, instead of having to rely on dozens of elaborate and confusing seating charts.

The system, based on an IBM System/36 processor, provides accurate information on ticket availability and helps locate seats for season ticket holders should they arrive at the game without their tickets.

Combines Functions

The computer combines data processing, word processing, business color graphics and office management functions. Its 516K-byte memory has the capacity to store over a half million characters.

The university has an IBM 3081 mainframe, but that is used almost entirely for administrative purposes.

The athletic department began using an IBM System/36 last July to process, print and record this summer's sales of season and over-the-counter tickets to Gamecock basketball games.

It has resulted in faster and more cost-efficient ticket processing, reordering, assigning and accounts receivables.

Jim Petrus, assistant business manager for athletics, said, "The implementation of the System/36 has reduced the need and the use of the current manual seating charts, while at the same time increasing overall efficiency within the department."

For Basketball Season

Petrus said the college decided to start out by implementing the computerized ticketing during the basketball season rather than during the more popular and crowded football season in case anything went wrong. "We could always back it up manually — which was how we did it before," he said.

Petrus said everything is going smoothly, and the university will have a similar ticket application in operation next year for the 72,400-seat Williams-Brice football stadium.

The seating charts for basketball games, 2-ft by 3-ft sheets of cardboard that provide a detailed view of the seating arrangement of the 12,139-seat USC coliseum, were used sparingly during the conversion. Each seat in the chart has the name of a ticket holder on it. In the past, salesmen had to flip through several charts to find the right seat, should problems arise.

In addition to using the computer to store seating charts and recall them with a few strokes on the keyboard of an easy-to-use workstation, the athletic department has converted the university's current mailing list computer program for the Gamecock Club — the booster organization of the USC athletic department.

The old program for the booster organization was written in Cobol for the university's IBM 3081 and was rewritten in RPG-II for the System/36, according to Petrus.

The new version will also be used for all future administrative, budgeting, planning and sports information retrieval required by the department, Petrus added.

Gary Goodman, athletic ticket manager for the University of South Carolina (USC), and Jim Petrus, USC assistant business manager, pose with the IBM workstation that will help fill 72,400 seats at Williams-Brice Stadium next fall. The USC athletic department used a System/36 to process and sell season tickets.

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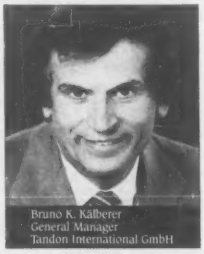

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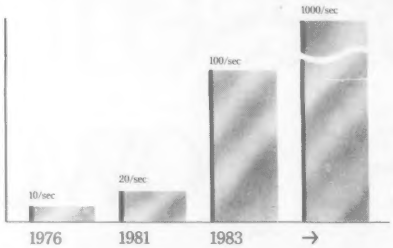

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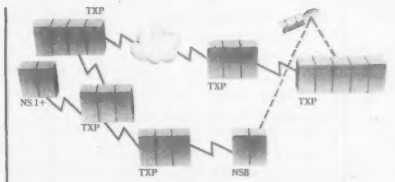

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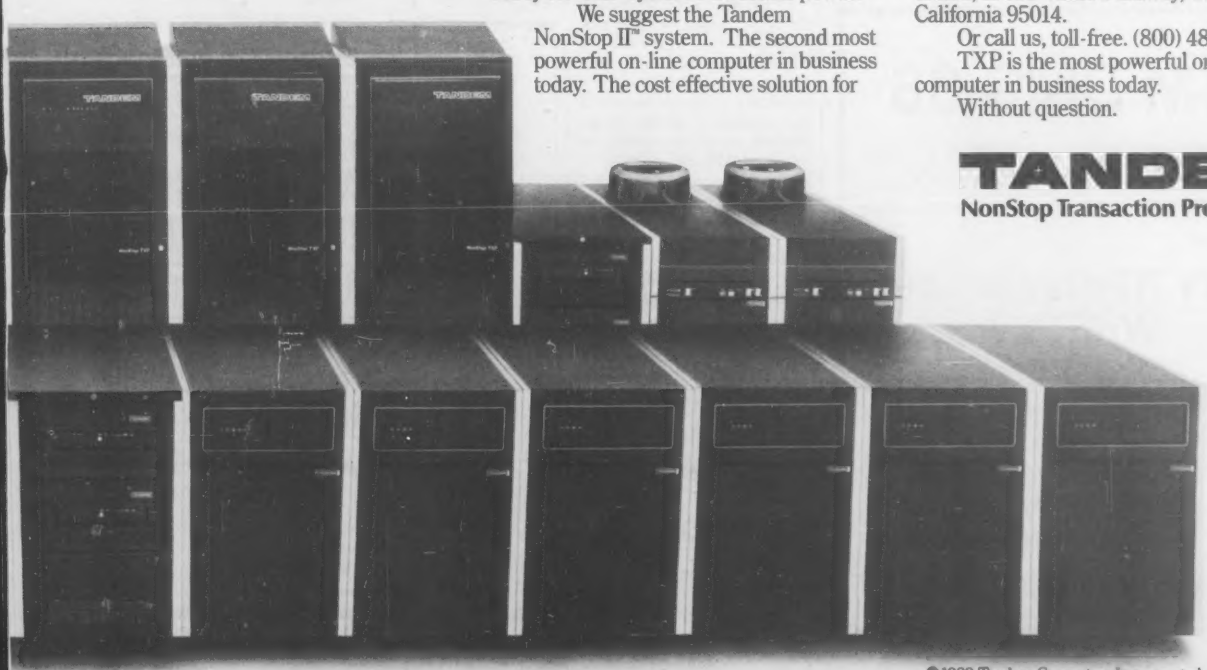

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Personal Computers as Permanent Guests

Hotel Chain Using Micros in Reservations Net

PHOENIX — Personal computers are becoming permanent guests at hotels belonging to the world's third largest hotel firm.

With the installation of 635 IBM Personal Computers in hotels throughout the U.S. and Canada, Ramada Inns, Inc. has become the first hotel chain to use the micros as reservations terminals.

The Personal Computers have been linked to the company's main reservations computers in Phoenix and to other hotels in the chain which has 97,000 rooms in more than 600 inns and hotels.

"We had a homegrown system which we developed over 10 years ago that ran on Digital Equipment Corp. processors," said Nicolas Bredimus, vice-president of the Information Services Division for Ramada here, "but it wasn't appropriate for the '80s.

"We changed our main reservation system and cut over in December 1982 to an IBM-based system which uses the Airline Control Program operating system used by most major airlines and travel companies," said Bredimus.

Right Time

"Then we followed up with a replacement of all the terminals. It just happened that at the time we were looking for a replacement terminal, IBM announced the Personal Computer," he added.

The Personal Computers were installed at the rate of about 60 per week over a 90-day period which ended this past September.

"The reason we chose IBM wasn't necessarily for performance but because that's where the availability of the best programs was. So it was a software decision," he added.

Reservations can be sent via the Personal Computer to individual Ramada Inns or to one of four reservations centers in Omaha, Neb., Toronto, London and Frankfurt, West Germany. Presently, the Personal Computers have been installed only in the company's North American hotels.

Ramada personnel are able to make, change and confirm reservations as well as supply guests with detailed information about any Ramada Inn worldwide.

Future Uses

According to Bredimus, future uses for the Personal Computers include electronic mail, hotel inventory, labor forecasting and financial planning and reporting.

"The use of the terminals for reservations is their primary function. But the main reason we went with the [Personal Computer] was because it's a dumb terminal and because of all the things that we could do locally at the hotel," Bredimus said.

The Personal Computer has been programmed with information on travel agencies and holders of Ramada Pacesetter cards.

When a travel agent or Pacesetter card holder calls for a reservation, all a clerk needs is the agent's code or the card holder's number, Bredimus said.

The computer then prints all of the pertinent reservation information, including home address and credit card number.

The computer also stores addresses and phone numbers for Ramada executive offices, reservations centers and sales offices worldwide.

"Up to this point the performance of the units has been excellent," according to Bredimus.

"We put a tutorial system right into the software because it was designed for people who have no prior experience with computers, and it actually shows them what every key on the keyboard does."

Besides saving time and adding to guest convenience, the Personal Computers are expected to reduce Ramada's communications costs, which will supposedly allow the hotel chain to keep its prices down.

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Wehr Corp.'s John Gevaert (left) and Brian Manley both use TIS Intelligent Query and Comprehensive Retrieval to facilitate their jobs, including computing of scrap percentages and monitoring customer credit.

Integrated Data Base Fulfills DP and User Requirements

MILWAUKEE — "Give the managers timely and accurate information so they can make good decisions."

That was the directive to data processing from Brian Nahey, president and chief executive officer of Wehr Corp., a "miniconglomerate" based here that manages a number of manufacturing firms located throughout the U.S.

Using the Total Information System (TIS), the integrated data base system from Cincom Systems, Inc., Wehr was able to satisfy the requirements of data processing as well as end users.

"TIS has allowed us not only to build a corporate data base, but also to give our users a logical view access to the data," Nahey said. "Whether the data is stored in a data base or another file structure is of no concern — the user can still access his data without going through data processing."

TIS is installed on an IBM 4341 Model Group 2 with OS/VS1 operating system and Vtam at Wehr headquarters. Eight company data bases and manufacturing systems are controlled by the TIS In-Line Directory in the computer center.

The key components of TIS are Logical User View, TIS In-Line Directory, TIS Data Base Management System (DBMS), TIS Data Manipulation Language, TIS Intelligent Query (IQ), decision support system capabilities, fourth-generation procedural language and TIS Communications Support System.

The first steps to allow managers to access information included implementation of computerized manufacturing and financial systems and Cincom's Series 80 Total DBMS.

"When TIS became commercially available in the spring of 1982 we had already built the integrated data base system and developed the on-line applications running under the Series 80 data base/data communications environment," stated DP manager Peter Puestow.

"With the implementation of the TIS data base system, the In-Line Directory became the central brain of the system controlling access, security, integrity and application development," he said.

The directory controls the interrelationships of the data during all phases of development, execution and maintenance, Puestow said.

The physical structure requirements are fulfilled, as well as the logical requirements of end users and programmers requesting data. Users can access information without knowing how it is physically stored, he said.

With the new TIS integrated data base system, the major concern for data processing at Wehr is educating the users. TIS IQ provides end users with relational query facilities. It is even possible to define the request on-line, save it in the In-Line Directory and execute the query in batch, Puestow said.

TIS Comprehensive Retrieval handles more complex decision support types of reporting, he said.

If TIS IQ cannot satisfy users' needs because they require more complex reporting or data manipulation, they can write a Comprehensive Retrieval program. Anything that cannot be done using Comprehensive Retrieval is programmed by data processing, Puestow said.

"I use Query to look for the exceptions that indicate trouble, such as inventory running out of control," said Bruce Kessler, manager of operational planning. "Then I use Query to design a solution, test it and monitor the results once the solution is in place."

Many general managers at the division levels of Wehr do not write their own queries but have access to someone in their own division who can write a Query or Comprehensive Retrieval program.

"I believe that as this proficiency increases among all our users, the data processing department will become the keepers of the data and educators of the end users to an even greater extent," Puestow said.

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Package to Monitor Transaction Status

Banks Poised to Use Securities Processing Tool

NEW YORK — Five banks in New York are apparently leading the way toward a goal long awaited by financial institutions and brokerage firms: fully automated securities processing.

The Bank of New York, Barclay's Bank International, Chemical Bank, Citibank and French American Banking Corp., a subsidiary of Banque Nationale de Paris, will be using a software package that monitors the physical location and transaction status of customers' securities for which the banks are custodians.

On a real-time basis, Vista Concepts, Inc.'s Security Processing System (VSPS) software makes information available on securities movement that historically has had to be gathered from separate sources, either manually or through less sophisticated data processing systems. VSPS runs on IBM mainframes and plug-compatibles in CICS environments.

When securities are traded, the system tracks them through every stage of the transaction sequence, using information on the securities' current status to determine the next trading step and to assure that it takes place on time.

As part of this tracking function, the system monitors receipt and delivery of payments for securities, dividends, interest payments and commissions.

Upon demand, securities processing personnel can determine whether securities are in certificate or book entry form, stored in the banks' vaults or in a depository, such as the Depository Trust Company (DTC), or en route between seller and buyer. VSPS automatically settles trades through the Institutional Delivery System via the DTC's Computer-to-Computer Facility. It also generates reports on their movements to bank customers and debits and credits their cash accounts, according to the vendor.

At the end of each day, it provides printed summaries of all transactions that took place that day as well as the current status of all transactions in process.

The software package updates customers' accounts by processing information on corporate actions, such as dividend declarations and stock splits and handles reregistration of securities into approved registrations.

For the five banks using VSPS, the software package will mean the elimination of costly and time-consuming manual methods that are still used in most back-office operations of many banks and brokerage firms.

Errors and delays in manual or partially automated operations — including the inability to locate stock certificates for timely delivery, the need to reclaim improperly paid dividends — are said to be eliminated by this system.

At Chemical Bank, which handles between 3,500 and 4,000 securities transactions per day, Vice-President Mike Romano claimed, "VSPS' functionality is what we needed. In terms of its capabilities, all the tests show that it will support us in the business."

According to Vista's Chairman of the Board, Steve Gardos, Vista is in the process of developing enhancements for the VSPS package that adapt it to the needs of medium-size and small banks (1,200 transactions per day and up) as well as brokerage firms' back offices.

Previously, their only practical means of access to automated securities processing had been through correspondent banks or specialized service bureaus whose monthly fees break down to a very high cost per securities transaction, Gardos maintained.

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Quarterly To Address MIS Concerns

PENNSAUKEN, N.J. — Auerbach Publishers, Inc. has announced a new quarterly publication titled "The Journal of Information Systems Management." The quarterly was "created to help DP people become better and more efficient managers by offering in-depth, practical advice on management issues and providing workable solutions for those special problems the MIS [management information systems] manager encounters daily," according to J. Kevin Reger, Auerbach president.

Articles and columns will be from the MIS professional's perspective. The periodical will cover issues affecting middle- and upper-level managers, such as how to reduce operating costs and provide practical advice on staff training, resource allocation and organizational structure.

The periodical is being introduced at a special charter price of $48. Regular subscription price is $60. Further information is available from Auerbach Publishers, 6560 N. Park Drive, Pennsauken, N.J. 08109.

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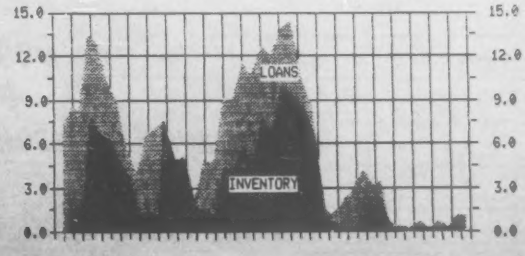

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Electric Firm Sparks Cost Savings With DBMS

BATON ROUGE, La. — A data base management system (DBMS) has generated real-cost savings at a major southern electrical power generation utility.

When Cajun Electric Power Cooperative, a nonprofit cooperative supplying electrical power to 13 member cooperatives throughout Louisiana, went looking for a DBMS, it first conducted an extensive market survey.

"We have a massive amount of data that is all interrelated. We were looking for a DBMS that would allow us to get a system up and running quickly, yet was readily modifiable at low cost. It also had to be a high-performance record access and transaction processing system," Dave Courtney, DP manager, explained.

Key Criteria

Rexcom, an integrated application development and management system from Rexcom Corp. of Houston, was chosen to operate on Cajun's networked Prime Computer, Inc. Prime 750 and 850 systems. "Key criteria were programmer productivity features, enough flexibility to handle all our needs in both engineering and business data processing and the capability to integrate existing software with our future plans, some of which we had not yet defined," said Don Babcock, supervisor of engineering systems.

"That last criterion was the critical issue," added Courtney."Today you can't predict what your data structure will look like even two years from now. You are left with basically two choices: Find an easily modifiable system, or spend six months to a year designing your data definitions and schemata and be prepared to throw it away in a couple of years."

Rexcom, which incorporates an automatically and transparently generated relational DBMS, answered needs for an interactive screen and menu-oriented system emphasizing query, reporting and transaction processing, Babcock said. "Rexcom's one-step screen generation was a real benefit to our staff. Being able to use the screen immediately for loading, querying and reporting right after it has been painted saves incredible amounts of time," he said.

Complicated schema design and data dictionary setup and intermediate compiling steps are automatically handled by Rexcom, Babcock said. "The system lets us concentrate on the design of our applications and not on how the computer is going to handle it. Additionally, the random record access speeds for both query and processing are phenomenal for any DBMS, much less relational system," he said.

"In a traditional DBMS, a tremendous amount of time is spent defining and building your relationships and creating convoluted schemata beforehand," Courtney added. "If six or seven months later you realize you have incorrectly defined a relationship or need to create a new one, you have to throw out most of the system and virtually start over.

"Rexcom allows you to make those design mistakes without penalty," Courtney said. "The relational capability is so easy to use that a complex data base can be integrated to secondary data bases or files in no time. New relationships and modifications to old ones can be made without ever having to deal with schemata or data dictionaries."

Courtney also pointed to the DBMS' ability to access other programs. In one case, a large Cobol batch system was already in place for payroll/personnel processing. The batch system is now tied into Rexcom via its load utility, and a mirror data base is created and updated by Rexcom after each batch run, he said. Administrative personnel are now able to do on-line querying, reporting and updating with Rexcom, while the Cobol data base is protected from modification or damage. The updates are then run back into the Cobol data base from Rexcom through an audit and edit program.

References Cover Programming

ESTILL SPRINGS, Tenn. — Associated Technology, Inc. has introduced a four-volume reference set designed to serve as a tool for establishing internal programming and software documentation practices.

The first three volumes of the set highlight standard methods for programming in the Cobol, Fortran and Basic languages, and the fourth covers software documentation practices.

The set is available for $45 from ATC Books, Rt. 2, Box 448, Estill Springs, Tenn. 37330.

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With Interactive Dictionary

Theatrical Index Organizes Galaxies of Stars

BEVERLY HILLS, Calif. — In an industry where fantasy often prevails over reality and happy endings abound, the legal administration department of 20th Century-Fox Film Corp. has developed its own happy ending to a real-life tale.

"Our traditional system for indexing contracts was becoming burdensome and inadequate," explained Les Gerber, 20th Century-Fox's manager of legal administration department. "We would index a contract by picture, artist and any other pertinent terms, which means we were averaging six index cards for every new contract. About four years ago we faced the reality that our central file room contained more than 50,000 index cards dating back to the time the studio was originally founded."

Gerber and his legal group, along with management information systems (MIS), installed a stand-alone data dictionary designed principally for IBM OS and DOS environments. Then with the technical and training support of MIS and legal central files personnel, they developed a program to automate their central file indexing system and ultimately to implement a central calendaring system.

"By computerizing the index," Gerber explained, "we could not only deal with a single entry, but also do all the cross-indexing necessary to make a great deal more information directly available."

Since Manager Software Products, Inc.'s Data Manager was implemented in June 1980, Gerber's Central Files staff has added over 7,000 entries utilizing more than 300 different catalog classifications in less time, in a smaller space, at lower cost and with less effort than ever before, he said.

"Data Manager provided us with a predesigned system that included a free-standing data base, maintenance, report and query programs and built-in security features," he said. "We were able to implement the system with limited MIS support."

Structured on a hierarchical basis, the system always locates the theatrical or television motion picture title as the highest level of entry, from which all other information entries flow.

Entries are then cataloged to show under which major classification — master index, cross-reference or people — the entry belongs. Then the whole system is broken down into various sections.

As an interactive dictionary that handles data relationships in a flexible manner, Gerber said, "Data Manager not only allows us to list files alphabetically and numerically, but also to add information to the index and update and retrieve it when needed."

Because the system classifies picture entries into types, Gerber's staff can easily zero in on what the entry actually represents, he said. Also, by listing motion picture titles as they change during development or production, the system leads the user back from the early working title into the final release title, he said. When a picture is created from a sequel or other existing work, the system informs the user, especially during a write/read search, to reference the original file.

From the second level in the system hierarchy, the legal staff can cross-index people and pictures, permitting search capabilities. By establishing a string of cross-entries and dummy entries all the way down the hierarchy the staff can cause all the data to relate back simply by querying the system with the right questions.

The success of the central files indexing system enabled the legal department to implement a calendaring feature.

"With more than 200 entries already in the system, Data Manager allows us to handle the calendaring system on a project and date basis — ranging from two months hence to 30 years or more into the future," Gerber said.

Health Care Users Set Spring Meeting

MONTEREY, Calif. — The spring meeting of Electronic Computing Health Oriented (Echo), an organization of IBM equipment users in the health care field, will be held at the Hyatt Delmonte here April 8-11.

The group's meetings are designed to bring together various computer-oriented personnel in the health care field, including systems executives, hospital administrators, physicians, hospital consultants and government officials. The group is comprised of more than 900 hospitals and health care related institutions and has a membership of more than 1,900 people.

Registration fees for the meeting are $150 for members and $165 for nonmembers. Additional information is available from Lee R. Cort, Stanford University Hospital, S310, 701 Welsh Road, Stanford, Calif. 94305.

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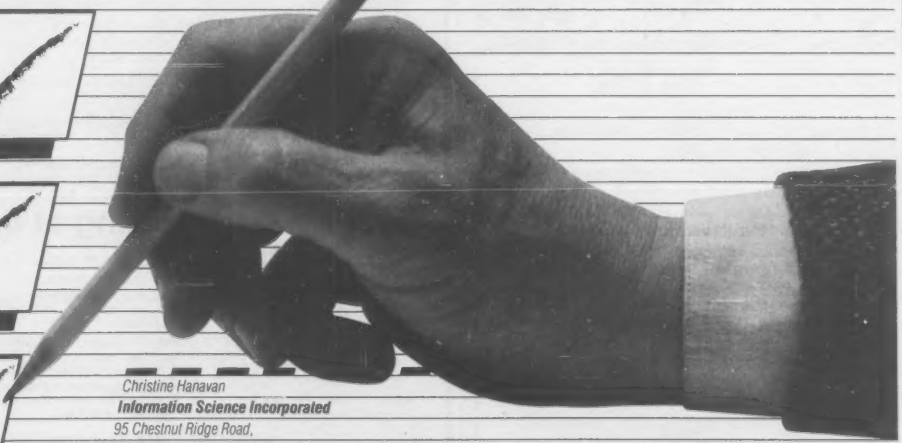

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Evolves From Outside Service Bureau

School Graduates to Distributed DP System

ELKHART, Ind. — Intelligent workstations that "talk" with mainframe computers are nothing new. However, it can be interesting when the workstations are distributed microcomputers and the system evolved from an outside service bureau operation.

The distributed system is implemented at the Elkhart Community Schools here and is used for such financial applications as payroll, accounts payable and general ledger, as well as for such administrative chores as word processing. However, that is an extensive job. The school district operates two high schools, four junior high schools and 14 elementary schools for about 11,400 students. More than 1,100 people are employed in the district that has an annual budget in excess of $32 million.

Based on an evaluation conducted with the assistance of the outside management consulting firm of Crowe Chizek and Co. of South Bend, Ind., the school district selected a distributed data processing system proposed by Low Associates and NCR Corp.

"This proposal was the only one that recommended a distributed data processing system as a solution to our needs," said Eugene Hungate, director of DP, federal programs and research. "The other proposals were for conventional, on-line systems."

Distributed DP System

Installed in mid-1983, the new distributed DP system was built around NCR's V-8545-II central processor with a VRX multiprocessing operating system, 1M byte of main memory, 540M bytes of disk storage and a 600 line/min printer. The 8545 mainframe system was installed in place of the previously used NCR Century 200 computer and its B-1 batch operating system.

The distributed DP system operates with 12 NCR Adds Multivision small business computer systems. Communications with the mainframe system is via two common-line controller/multiline adapters tied into eight dial-up and two hard-wired lines. These multiuser micros provide 256K bytes of main memory and 15M bytes of disk storage and support the operation of one to four workstations.

Previously, the Elkhart Community School district handled DP operations through multiple outside service bureaus. In 1978, the district consolidated these operations in a single service bureau that processed all applications in a batch mode.

Then in early 1980, consideration was given to the possibility of improving operations through increased DP automation, according to Hungate. He discussed the subject with Joseph F. Scher, assistant superintendent for business affairs, who identified many areas in which productivity improvements could be made. Based on the positive support of Richard D. Miller, the superintendent of Elkhart Community Schools, an automation project was launched in August 1980.

Low Associates, a DP services organization specializing in the educational field, had served as the district's service bureau processing applications on NCR's Century 200 system.

Since the system was designed to be distributed, it was possible to implement one application at a time on a phased basis, Donald H. Kramer, assistant superintendent for business services, said. The first application brought up was payroll. This was followed by accounts payable and financial, including the general ledger. Other applications that are now operating on the system, or will be implemented in the future, include student attendance and enrollment, personnel, insurance, students records, grade reporting, scheduling, inventory control, fixed assets accounting and book rentals.

For each application, microcomputers are used for all day-to-day data entry, editing, balancing, processing and maintenance on an on-line, interactive basis. Data is also downloaded from the mainframe system via phone lines to microcomputers. In addition, the microcomputers are used to make data inquiries to the mainframe and communicate with each other. Then at the end of predetermined processing cycles, data is transmitted back to the mainframe for batch processing operations.

The system can be expanded without causing degradation in response times. Income can also be generated by providing DP services to other school systems without the need to upgrade mainframe system capabilities.

Elkhart Community Schools has also used the distributed network to provide DP services on a remote basis to the Penn-Harris-Madison School Corp., a neighboring school system based in Osceola, Ind. Serving 6,700 students in one high school, two middle schools and nine elementary schools, Penn-Harris-Madison is using the network to achieve increased efficiency and accuracy, faster turnaround and better control, according to Kramer.

"We're working with the distributing data processing network instead of installing our own mainframe system," Kramer said. "We're better off doing this than taking on the problems of personnel and training involved in operating a mainframe.

"In addition, the distributed network is easier to work with than previous service bureau operations," he said. "We're able to solve balancing and other problems before transmitting data to the mainframe, minimizing the need for later corrections by phone," Kramer said.

"We're excited about the capabilities of the system in terms of its management information, word processing and other capabilities," Richard Miller, Elkhart superintendent, said. "We see definite improvements in information processing and other areas of school system operations. In the future, we would like to put system terminals in the homes of all of our board members so that school information would be immediately available to them at all times."

Feigenbaum, Martin to Talk On Fifth-Generation Future

ARLINGTON, Va. — Edward A. Feigenbaum, professor of computer science at Stanford University and the author of *The Fifth Generation*, and consultant James Martin are among 14 guest speakers featured at a lecture series entitled "Knowledge Base and the Fifth Generation" that gets under way today at the Sheraton Crystal City Hotel here. The four-day event, which will conclude this Thursday, is being sponsored by the Technology Transfer Institute of Santa Monica, Calif.

A group of American and Japanese computer experts will discuss the implications of Japan's national goal to develop intelligent, fifth-generation computers to establish a "knowledge industry" in which knowledge itself will be available for sale.

Besides Feigenbaum and Martin, speakers will include Koichi Furukawa, chief of the Second Research Laboratory of the Institute for New Generation Computer Technology, a Tokyo-based research and development group; Ralph E. Gomory, vice-president and director of research for IBM's Research Division; Samuel Fuller, technical director for engineering, Digital Equipment Corp.; Michael L. Dertouzos, MIT professor of electrical engineering and computer science; and Takeo Kanade, associate professor at Carnegie-Mellon University's Computer Science Department and Robotics Institute.

Registration fee for the series is $995. Further information is available from the Technology Transfer Institute, which can be reached at 741 10th St., Santa Monica, Calif. 90402.

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System Bails Out Troopers From Paperwork

RALEIGH, N.C. — Time-consuming paperwork threatened to keep North Carolina state troopers from their patrols, but now a computer system is helping to put troopers back on the highway.

Daily activity reports — among the paperwork that consumes 30% of an officer's work day — are now being compiled by computer, allowing troopers to stay on patrol longer, North Carolina Highway Patrol officials said.

Once applications work is completed, the IBM 4341-based system is expected to give patrol officials the capability to deploy troopers more effectively and so help curb serious traffic accidents by 25%. Although all computer equipment has been installed and is up and running, Patrol Lt. Richard Suddarth estimates it will be another two years before all programming and applications work, "still in the developmental stage," is completed.

Necessary Support

The IBM system itself was installed over the summer, according to Suddarth, who noted the Highway Patrol depended on manual processing of data prior to the system's installation. "We looked at everything that was available, but chose IBM because it gave us the support we needed at a price we could afford," he said. The system includes 89 terminals, including IBM Models 8775, 3276 and 3279. In addition, there are 59 printers, including IBM Models 3230 and 3287.

The IBM system also helps patrol officials know when a trooper is in potential danger. North Carolina's Highway Patrol is the first such decentralized organization in the nation to automate its radio dispatch system, linking its various troop branches to centralized information services through the system.

The dispatch system, called computer-assisted dispatch, is modeled after a system used by several centralized city police departments, Suddarth said. Robert Melott, deputy secretary of the state's Crime Control and Public Safety Department, credits its close cooperation between agencies for the system's effectiveness.

The IBM computer is a component of the Highway Patrol's communications network, which enables the Patrol to share information and data with several state agencies and departments, including the Division of Motor Vehicles and the Administration Office of the Courts.

As a trooper reports daily activity to the communications center, a radio dispatcher will log that data into the computer, which will produce a work record that an officer would otherwise have to write by hand at the end of the day. "Our projections indicate that if it can save one hour per man per day it can put the equivalent of 108 [additional] troopers on preventive patrol," according to Suddarth.

The Patrol will automate as many of its manual record-keeping functions as possible, Melott said. Computerization of vital records, particularly those relating to arrest and traffic accidents, will greatly benefit troop supervisors who are responsible for direct management of patrol operations.

Data about the frequency and location of arrests and traffic accidents — which took at least three months to compile by hand — will be available much more quickly through the computer. A Patrol supervisor, for instance, would be able to examine computer-prepared analyses of accident data on a daily basis.

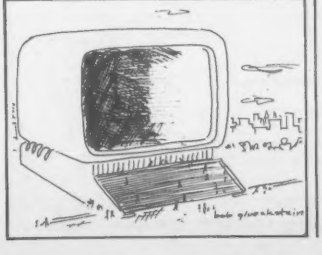
That speedy analysis will enable the supervisor to pinpoint accident trouble spots quickly and assign officers to patrol those areas to prevent further accidents.

With relevant data and effective trooper deployment, Highway Patrol officials believe they can reduce death and injury accidents on North Carolina highways by 25%. "If we can find out on a timely basis where accidents are happening, instead of [waiting] three or six months, we can respond faster," Melott said.

Patrol officials will also use the IBM system and the state network to keep in constant touch with troopers when they respond to potentially dangerous calls. If the trooper fails to contact headquarters at frequent, prescribed intervals, the computer alerts the radio dispatcher through a changing color screen on video display terminals at communications centers.

The dispatcher can summon backup help for the trooper after determining if the officer needs help. Also, the computer can locate nearby officers that could respond to the emergency.

"As we've told the people we've trained, the actual applications you can do are limited only by your imagination," Patrol Sgt. Julian Hendricks said.



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Only Two Packages Make Datapro's Top Group

(Continued from Page 1)

A total of 46 individual packages from 31 vendors were rated by 10 or more respondents to the Datapro survey. Respondents were asked to rate no more than two packages. Packages were rated on a scale of one to four, with one equaling "poor" and four equaling "excellent."

To win top-rated honors, a package must be rated "excellent" in overall satisfaction and either "excellent" or "good" in each of eight other categories by survey respondents who use those packages.

Users' Stats

The survey of 2,269 users also revealed the following statistics:

- Most respondents (88.3%) use separately priced software (software not bundled in with the hardware when a system is bought) that is acquired from their hardware vendor or an independent vendor.
- Over 90% of the users said the primary benefits of the package they rated were savings in human resources. Other significant advantages included flexibility (75.5%), simplicity (61%) and compatibility (58.4%).
- The primary disadvantages of the packages evaluated by respondents included complexity (28.8%), slowness (24.5%) and an excessive use of resources (24.5%).
- Packages performed immediately for 85.1% of the users, while 7.8% reported that the package they rated never performed as promised.
- The vast majority of packages can be run with little or no modification. Of the 33.3% of the respondents who reported that modifications were necessary, nearly two-thirds said that all modifications were paid for by the vendor.
- Users unanimously said they saved money on at least one of the software packages they evaluated. Only 3.4% said they lost money on a software package.
- One hundred percent of the users acquired at least one package by permanent license.
- Asked whether previously published user ratings influenced their decision whether to acquire a particular package, 37% said yes, while 60.2% said no. Of the 850 respondents to the question, 65% said their subsequent experience confirmed the survey information, while 3% said their experience contradicted the survey results.

The packages surveyed in the Datapro study were rated in each of the following nine areas:

- Reliability.
- Efficiency.
- Ease of installation.
- Ease of use.

Vendor technical support:

- Troubleshooting.
- Documentation.
- User education.
- Vendor maintenance.
- Overall satisfaction.

Survey Ratings Came From 2,269 Users

DELRAN, N.J. — The road to the results of Datapro Research Corp.'s 1983 "User Ratings of Proprietary Software" began some 7,000 names ago with a list of known computer sites obtained by Datapro from International Data Corp., the Framingham, Mass.-based market research firm.

The sites that received survey questionnaires were selected on an nth-name basis after excluding computer manufacturers, software suppliers and service bureaus.

A four-page, 27-question survey sent to the users included three general questions addressing their use of separately priced software, budgetary issues and the effect of published ratings on the selection of software.

Two sections of 12 questions each asked the users to rate specific software packages.

Datapro requires a 50% or better survey response to achieve reliable statistics. A total of 1,846 telephone surveys were conducted to supplement the mailed responses, resulting in a response rate of 59.9%.

Ratings for 3,265 Packages

There were 2,269 respondents to the survey who together rated 3,265 packages. The results listed in the charts on the next two pages reflect all packages rated by 10 or more respondents.

The charts cover most categories of applications software. Prices range from the cost of the recording media up to hundreds of thousands of dollars.

Datapro makes available a complete listing of ratings of all packages that were rated by three or more users.

The report is available for $25 from Datapro Research, located at 1805 Underwood Blvd., Delran, N.J. 08075.

Ups and Downs

DELRAN, N.J. — Twenty-four of the packages rated in Datapro Research Corp.'s 1983 "User Ratings of Proprietary Software" were also included in the previous year's scoring. Three packages experienced improvements in overall satisfaction of .3 or better: Burroughs Corp.'s DMS, from 3.0 in 1982 to 3.3 in 1983; Computer Associates International, Inc.'s CA-Sort, from 3.4 to 3.7; and Henco Software, Inc.'s Info, from 2.9 to 3.3.

Four packages saw decreases of .3 or more in overall satisfaction between the last two surveys: Information Builders, Inc.'s Focus, from 3.2 to 2.9; Management Science America, Inc.'s Payroll package, from 2.9 to 2.5; SAS Institute, Inc.'s SAS, from 3.7 to 3.4; and Visicorp's Visicalc, from 3.5 to 3.1.

Compared with data from the 1981 survey, two packages saw overall satisfaction increase by .6 points: IBM's Cmas, from 2.4 to 3.0, and McCormack & Dodge Corp.'s Accounts Payable package, from 2.3 to 2.9. The overall satisfaction rating for Para Research, Inc.'s Paratext package fell from 3.1 to 2.5 in the same period.

Cluster Analysis Groups Software

The right-hand chart on each of the next two pages rates the packages included in Datapro Research Corp.'s 1982 "User Ratings of Proprietary Software" based upon a cluster analysis. The analysis is employed to provide an objective procedure for grouping similar packages on the basis of the proximity of their mean averages within a single attribute, according to Datapro.

Cluster analysis separates the packages into four distinct groups so that the mean ratings for packages within a given group are made more homogenous. Datapro took the mean average response for each of nine categories provided (see charts) and determined the average user rating in those categories for all the packages surveyed. One represents the highest rating, while four is the lowest rating. User responses were merged into clusters by a computer program so that, in the end, responses were narrowed down to four categories.

Cluster analysis provides a more definitive line of demarcation than that provided by mean average ratings, Datapro explained. Packages forming a particular cluster within an attribute are more alike, based upon their mean response, as compared to the packages found in other clusters.

Reliability

Cluster 1 : 3.57-4.0
Cluster 2 : 3.17-3.56
Cluster 3 : 2.8 -3.14
Cluster 4 : Below 2.8

Trouble Shooting

Cluster 1 : 3.14-4.0
Cluster 2 : 2.63-3.13
Cluster 3 : 2.0 -2.62
Cluster 4 : Below 2.00

Efficiency

Cluster 1 : 3.47-4.0
Cluster 2 : 2.90-3.46
Cluster 3 : 2.33-2.89
Cluster 4 : Below 2.33

Documentation

Cluster 1 : 3.13-4.0
Cluster 2 : 2.57-3.12
Cluster 3 : 2.0 -2.56
Cluster 4 : Below 2.0

Ease of Installation

Cluster 1 : 3.50-4.0
Cluster 2 : 3.06-3.49
Cluster 3 : 2.53-3.05
Cluster 4 : Below 2.53

User Education

Cluster 1 : 3.19-4.0
Cluster 2 : 2.57-3.18
Cluster 3 : 2.00-2.56
Cluster 4 : Below 2.0

Ease of Use

Cluster 1 : 3.43-4.0
Cluster 2 : 2.88-3.42
Cluster 3 : 2.32-2.87
Cluster 4 : Below 2.32

Vendor Maintenance

Cluster 1 : 3.43-4.0
Cluster 2 : 3.05-3.42
Cluster 3 : 1.33-3.04
Cluster 4 : Below 1.33

Overall Satisfaction

Cluster 1 : 3.4 -4.0
Cluster 2 : 2.88-3.39
Cluster 3 : 2.33-2.87
Cluster 4 : Below 2.33

Datapro Research Corp. Chart

Mean Average Ratings Distributed in Each Cluster

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User Ratings of Software Packages

Vendor and Package Name	Pkg. Class	No. of User Ratings Received	Mean Average User Ratings								
			Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Troubleshooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
Applied Data Research											
Vollie	5	16	3.9	3.7	3.4	3.7	3.4	3.3	3.1	3.3	3.4
Ask Computer Systems											
Manman	7	12	3.5	3.0	3.6	3.6	3.1	2.5	2.9	3.4	3.2
Burroughs											
DMS II	1	10	3.8	3.1	2.8	3.0	2.5	2.5	2.7	2.9	3.0
Business Comp. Design											
Docu-mint	2	10	3.3	2.9	3.4	3.4	2.5	2.7	2.6	2.6	2.9
Candle Corp.											
Omegamon	3	16	3.9	3.5	3.7	3.2	3.4	3.1	3.0	3.2	3.5
Century Analysis											
Boss/3	1	13	3.6	3.2	2.8	3.4	3.2	2.7	2.8	3.1	3.0
Cincom Systems											
Total	1	11	3.5	2.7	3.0	2.7	2.7	2.6	2.7	2.8	2.8
Computer Associates											
CA-Dynam/D	3	12	3.6	3.3	3.2	3.3	3.0	3.4	2.9	3.3	3.3
CA-Dynam/T	3	21	3.5	3.1	2.8	3.4	2.7	2.9	2.6	2.9	3.0
CA-Sort	5	11	3.9	3.7	3.6	3.8	3.3	3.4	2.8	3.2	3.7
Cullinet Software, Inc.											
IDMS	1	19	3.5	3.1	2.9	3.1	3.1	2.8	2.9	3.1	3.3
Henco Software, Inc.											
Info	1	10	3.4	2.6	3.7	3.5	2.8	2.9	3.0	3.2	3.3
IBM											
Accounts Payable	7	13	3.2	2.8	2.9	3.0	3.0	3.2	2.7	2.9	2.8
CICS	4	15	3.5	2.9	2.1	2.5	2.8	2.7	2.6	3.0	2.9
CMAS	7	10	3.7	3.3	3.0	3.1	3.1	3.1	2.8	2.9	3.0
Copics	7	12	3.3	2.6	2.4	2.4	2.9	2.4	2.3	2.7	2.8
General Ledger	7	17	3.4	3.1	3.1	3.0	3.2	3.3	3.2	3.1	3.1
Inventory System	7	12	3.2	2.8	2.8	2.8	2.9	2.8	2.5	2.8	2.8
Mapics	7	102	3.3	2.7	3.0	2.9	2.9	3.2	2.8	3.1	3.0
Payroll	7	17	3.4	2.6	2.8	2.8	2.3	2.6	2.4	2.7	2.8
Information Builders											
Focus	1	11	3.3	2.5	3.5	3.3	2.4	2.5	2.9	2.8	2.9
Innovation Data Processing											
FDR	5	12	4.0	3.8	3.8	3.7	3.4	3.4	2.9	3.6	3.6
Johnson Systems											
JARS	3	10	3.4	2.9	3.1	2.8	2.8	3.3	3.0	3.0	3.0

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

Datapro Research Corp. Chart

Vendor and Package Name	No of User Ratings Received	Hierarchical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Troubleshooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
Applied Data Research										
Vollie	16	1	1	2	1	1	1	2	2	1
Ask Computer Systems										
Manman	12	2	2	1	1	2	3	2	2	2
Burroughs										
DMSII	10	1	2	3	2	3	3	2	3	2
Business Comp. Design										
Docu-mint	10	2	2	2	2	3	2	2	3	2
Candle Corp.										
Omegamon	16	1	1	1	2	1	2	2	2	1
Century Analysis										
Boss/3	13	1	2	3	2	1	2	2	2	2
Cincom Systems										
Total	11	2	3	3	3	2	2	2	3	3
Computer Associates										
CA-Dynam/D	12	1	2	2	2	2	1	2	2	2
CA-Dynam/T	21	2	2	3	2	2	2	2	3	2
CA-Sort	11	1	1	1	1	1	1	2	2	1
Cullinet Software, Inc.										
IDMS	19	2	2	3	2	2	2	2	2	2
Henco Software, Inc.										
Info	10	2	3	1	1	2	2	2	2	2
IBM										
Accounts Payable	13	2	3	3	2	2	1	2	3	3
CICS	15	2	2	4	3	2	2	2	3	2
CMAS	10	1	2	3	2	2	2	2	3	2
Copics	12	2	3	4	3	2	3	3	3	3
General Ledger	17	2	2	2	2	1	1	1	2	2
Inventory System	12	2	3	3	3	2	2	3	3	3
Mapics	102	2	3	3	2	2	1	2	2	2
Payroll	17	2	3	3	3	3	2	3	3	3
Information Builders										
Focus	11	2	3	1	2	3	3	2	3	2
Innovation Data Processing										
FDR	12	1	1	1	1	1	1	2	1	1
Johnson Systems										
JARS	10	2	2	2	3	2	1	2	3	2
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:										
Cluster 1:		3.57 to 4.0	3.47 to 4.0	3.5 to 4.0	3.43 to 4.0	3.14 to 4.0	3.13 to 4.0	3.19 to 4.0	3.43 to 4.0	3.4 to 4.0
Cluster 2:		2.17 to 3.56	2.9 to 3.46	3.06 to 3.49	2.88 to 3.42	2.63 to 3.13	2.57 to 3.12	2.57 to 3.18	3.05 to 3.42	2.88 to 3.39
Cluster 3:		2.8 to 3.16	2.33 to 2.89	2.53 to 3.05	2.32 to 2.87	2.0 to 2.62	2.0 to 2.56	2.0 to 2.56	1.33 to 3.04	2.33 to 2.87
Cluster 4:		Below 2.8	Below 2.33	Below 2.53	Below 2.32	Below 2.0	Below 2.0	Below 2.0	Below 1.33	Below 2.33

Datapro Research Corp. Chart

User Ratings of Software Packages

Vendor and Package Name	Pkg. Class.	No. of User Ratings Received	Mean Average User Ratings								
			Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble-shooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
Management Science America (MSA)											
General Ledger	7	19	3.1	2.6	2.3	2.5	2.6	2.6	2.9	2.5	2.9
Payroll	7	19	2.9	2.1	2.1	2.3	2.4	2.4	2.6	2.5	2.5
McCormack & Dodge											
Accounts Payable	7	14	3.0	2.6	2.7	2.9	3.0	2.8	3.2	2.8	2.9
General Ledger	7	19	3.3	2.7	2.5	2.9	2.5	2.8	3.1	2.7	2.9
Micropro											
Wordstar	7	20	3.5	3.2	3.1	3.1	2.4	2.6	2.5	2.5	3.1
Microsoft											
Multiplan	7	14	3.8	3.2	3.5	3.4	2.9	2.9	2.9	3.0	3.4
Oxford Software											
UFO	1	16	3.2	3.0	2.9	2.9	2.8	2.8	2.6	2.9	2.9
Pansophic Systems											
Easytrieve	1	17	3.7	3.5	3.5	3.4	3.3	3.2	3.1	3.3	3.4
OWL	2	10	3.7	3.4	3.2	3.6	3.1	2.8	2.5	2.8	3.3
Panvalet	5	15	3.6	3.6	3.6	3.5	3.4	3.1	2.9	3.2	3.3
Para Research											
Paracalc	7	23	3.5	2.7	3.6	2.8	2.8	2.5	2.3	2.8	2.8
Paratext	7	21	3.2	2.6	3.2	2.2	2.4	2.5	2.2	2.3	2.5
The Poise Company											
Poise	7	10	3.3	2.4	2.9	3.1	2.4	2.6	2.6	2.6	2.9
Quasar											
Powerhouse	2	10	3.8	3.6	3.9	3.9	2.9	2.8	3.3	3.4	3.9
Quick	2	10	3.3	3.0	3.2	3.2	2.8	2.9	2.8	3.1	3.0
SAS Institute											
SAS	7	11	3.6	3.4	3.5	3.5	3.2	3.1	3.0	3.2	3.4
Software International											
General Ledger	7	35	3.3	2.6	2.6	2.6	2.5	2.3	2.5	2.4	2.6
Sorcim											
Supercalc	7	10	3.7	3.1	3.6	3.4	2.6	2.6	2.5	2.7	3.3
SPSS, Inc.											
SPSS	7	24	3.4	2.8	3.2	3.0	2.9	3.2	2.9	3.2	3.2
Syncsort, Inc.											
Syncsort	5	22	3.9	3.9	3.6	3.6	3.6	3.2	2.9	3.5	3.6
1040 Software Inc.											
Software 1040	7	15	3.7	3.7	3.4	3.5	3.5	3.5	3.5	3.9	3.8
University Computing Co.											
UCC 1 Tape M.S.	3	10	3.9	4.0	3.3	3.4	3.3	3.3	2.9	3.4	3.5
VisiCorp											
Visicalc	7	25	3.6	3.3	3.5	3.0	2.8	3.0	2.7	2.9	3.1

Datapro Research Corp. Chart

Vendor and Package Name	No of User Ratings Received	Hierarchical Cluster Groupings								
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support: Trouble-shooting	Vendor's Technical Support: Documentation	Vendor's Technical Support: User Education	Vendor's Maintenance	Overall Satisfaction
Management Science America (MSA)										
General Ledger	19	3	3	4	3	3	2	2	3	2
Payroll	19	3	4	4	4	3	3	2	3	3
McCormack & Dodge										
Accounts Payable	14	3	3	3	2	2	2	1	3	2
General Ledger	19	2	3	4	2	3	2	2	3	2
Micropro										
Wordstar	20	2	2	2	2	3	2	3	3	2
Microsoft										
Multiplan	14	1	2	1	2	2	2	2	3	1
Oxford Software										
UFO	16	2	2	3	2	2	2	2	3	2
Pansophic Systems										
Easytrieve	17	1	1	1	2	1	1	2	2	1
OWL	10	1	2	2	1	2	2	3	3	2
Panvalet	15	1	1	1	1	1	2	2	2	2
Para Research										
Paracalc	23	2	3	1	3	2	3	3	3	3
Paratext	21	2	3	2	4	3	3	3	3	3
The Poise Company										
Poise	10	2	3	3	2	3	2	2	3	2
Quasar										
Powerhouse	10	1	1	1	1	2	2	1	2	1
Quick	10	2	2	2	2	2	2	2	2	2
SAS Institute										
SAS	11	1	2	1	1	1	2	2	2	1
Software International										
General Ledger	35	2	3	3	3	3	3	3	3	3
Sorcim										
Supercalc	10	1	2	1	2	3	2	3	3	2
SPSS, Inc.										
SPSS	24	2	3	2	2	2	1	2	2	2
Syncsort, Inc.										
Syncsort	22	1	1	1	1	1	1	2	1	1
1040 Software Inc.										
Software 1040	15	1	1	2	1	1	1	1	1	1
University Computing Co.										
UCC 1 Tape M.S.	10	1	1	2	2	1	1	2	2	1
VisiCorp										
Visicalc	25	1	2	1	2	2	2	2	3	2

Datapro Research Corp. Chart

Once, and for all.

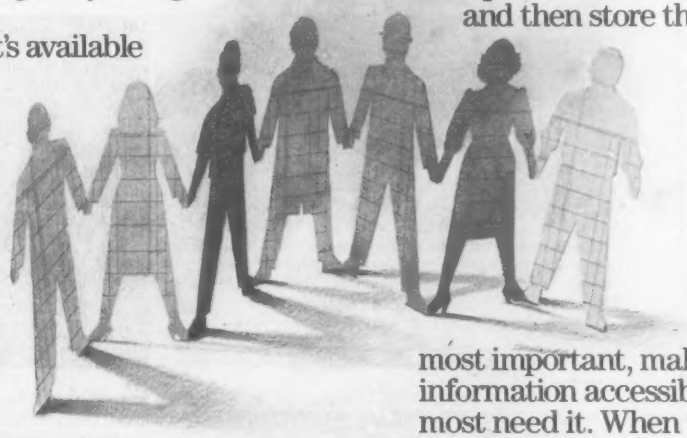
Cullinet's General Ledger and Financial Software System.

Enter an item in one component of Cullinet's Financial System, general ledger for example, and it's entered in all of Cullinet's Financial System components.

Enter it once and you can access financial data through any of eight components.

Entered once, it's available for all.

This is only possible because all of Cullinet's Financial components share a common database. This integration is so thorough that data can be called up from separate components joined and viewed together at the same time. This integration also extends to the full line of Cullinet applications software (our manufacturing system, for instance).



Personal computer applications are also integrated in this unique enter-it-once-enter-it-for-all system. A person can access financials directly from the database, manipulate them on a personal computer and then store the results in Cullinet's Database Management System. Features such as these suggest that Cullinet's Financial System may be the most effective way to eliminate data redundancy, facilitate monthly closings and, most important, make accurate financial information accessible to the people who most need it. When they most need it.

Once, and for all.

For more information on Cullinet's Financial System or a seminar schedule call (617) 329-7700.

Cullinet

Seminars on Cullinet's Financial Software System will be held in the following cities during the coming weeks: Harrisburg, PA Nov. 22; Meadowlands, NJ Nov. 30; Minneapolis, MN Nov. 29; Regina, SASK Nov. 15; Tampa, FL Nov. 29; Valley Forge, PA Dec. 1; Vancouver, BC Nov. 30 and Washington, DC Nov. 22.
To reserve a place call Harry Merkin at (617) 329-7700.

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Calendar

Week of Nov. 13

Nov. 16-17, Washington, D.C. — **Relational Data Base Systems.** Contact: Friedman and Fuller Training Center, Suite 350, 11140 Rockville Pike, Rockville, Md. 20852.

Nov. 16-17, Los Angeles — **Data Modeling and Conceptual Data Base Design.** Contact: Dr. Jack Hokikian, Skyline Information Systems, Suite 900, 3250 Wilshire Blvd., Los Angeles, Calif. 90010.

Nov. 16-18, Phoenix — **Micro and Personal Computers: Technical and Applications.** Contact: Registrar, Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Nov. 16-18, Seattle — **Local-Area Networks.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Nov. 16-18, Orlando, Fla. — **Data Communications: A Complete Overview and Update.** Contact: Data-Tech Institute, 100 Myrtle Ave., Nutley, N.J. 07110. Also being held Nov. 28-30 in Cincinnati.

Nov. 16-18, San Francisco — **SAS Basics Course (Portable).** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Nov. 16-18, Seattle — **Unix.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

Nov. 16-18, Houston — **Data Communications Concepts and Facilities.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Nov. 16-18, Anaheim, Calif. — **Robotics and Artificial Intelligence.** Contact: The Technology Transfer Society, P.O. Box 3608, Department RAI, Torrance, Calif. 90510.

Nov. 16-18, Orlando, Fla. — **Network Communications Protocols.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

Nov. 17-18, New York — **Local-Area Networks: Selection Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 17-18 in Chicago.

Nov. 17-18, New York — **Shell Programming on the Unix.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

Nov. 17-18, Chicago — **Beyond System/34.** Contact: Techtran, 72 Cummings Point Road, Stamford, Conn. 06904.

Nov. 17-18, San Francisco — **Financial Analysis for Telecommunications Professionals.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Nov. 17-18, San Francisco — **Fourth-Generation Systems and Language.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 17-18, Atlanta — **IMS/VS Dump Reading.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

Nov. 17-18, Washington, D.C. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Nov. 17-18, Chicago — **DP for Key Users.** Contact: Ed Green, Peat, Marwick, Mitchell and Co., 810 Seventh Ave., New York, N.Y. 10019.

Nov. 17-18, San Francisco — **Developing Business DP Systems.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Nov. 17-18, Washington, D.C. — **Voice-Data Integration and the Digital PBX.** Contact: Phillips Publishing, Inc., Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md. 20814.

Nov. 17-18, Cary, N.C. — **SAS Color Graphics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Nov. 17-18, San Diego — **Imple-**

Optical Memory Focus of Meeting

SAN FRANCISCO — A technical conference on the future of optical memories scheduled here Dec. 5-7 will feature speakers from IBM, Eastman Kodak Co. and 3M Corp.

Sponsored by Rothchild Consultants, publisher of *Optical Memory Newsletter*, the First International Technology Opportunity Conference will focus on "The Future of Optical Memories, Video Disks and Compact Disks to the Year 2000." It will feature interactive meetings at which vendors and end users will discuss the workings and uses of optical storage technology and analyze its business potential.

Dr. David H. Davies, project manager for 3M's optical recording project, will deliver the keynote address on "Laser Optical Information Storage: Wave of the Future."

Other speakers will include Dr. James U. Lemke and Stuart Lambers of Eastman Kodak; Dr. Barry H. Schectman, manager of applied science at IBM; Andrew Lippman of MIT; and senior executives of Sony Corp., Canon, Inc., Drexler Technology Corp. and others.

The conference, which will be limited to approximately 100 people, will be held at the Sir Francis Drake Hotel. The registration fee is $695.

More information is available through Technology Opportunity Conference, P.O. Box 14817, San Francisco, Calif. 94114.

IF YOU'RE CONSIDERING
CONSIDER

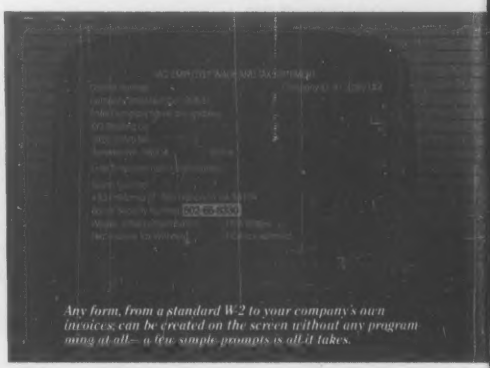
As a knowledgeable personal computer user, you know that there's a world of difference between first generation software products and second. (Think of VisiCalc™ and Lotus 1-2-3,™ for example.)

It's the difference between setting standards. And then raising them.

INTRODUCING R:BASE,™ FROM MICRORIM.™

R:base is the new generation of relational database software. With a combination of capacity, speed and transportability that today's more powerful PC applications need. (Check out the comparisons.)

Not only that, R:base is much simpler to use and learn. So your applications are up in days, instead of weeks. And anyone—computer literate or not—can enter and view data, and generate reports. Just what you would expect from a second generation product.



Any form, from a standard W-2 to your company's own invoices, can be created on the screen without any program using at all— a few simple prompts is all it takes.

MANAGING A DATABASE. CONVENIENTLY.

With R:base, it's simple. A series of prompts guides you every step of the way. Which means you don't have to be a programmer to create data entry or report forms just like the ones you're used to using.

As you become more proficient, you'll create shortcuts by customizing menus of stored commands. And print reports as simple or complex as you like at the touch of a key. With R:base, prompted, ad-hoc queries and customized report formatting become the reality that first generation products could only promise!

R:base is also very forgiving. It's very hard to make a mistake. That's because commands are simple English expressions—like SELECT, PROJECT, WITH, WHERE, FROM, etc. Dates and dollar amounts are written normally: 11/16/83;

	MAXIMUM RECORDS/ DATABASE	FILES AVAILABLE CONCURRENTLY	MAXIMUM NUMBER FIELDS/ DATABASE	TIME TO SORT 1000 RECORDS* (MIN:SEC)	UPDATE MULTIPLE FILES CONCURRENTLY	PRICE (LIST)
R:BASE 4000	100 billion	40	400	0:59	Yes	$495
dBASE II	65,535	2	32	5:47	No	$695
CONDOR	32,768	2	127	2:03	No	$650

*Sort 1000 records on 1 key value. (IBM PC with 256K and DS DD diskettes)

dBASE II is a trademark of Ashton-Tate. VisiCalc is a trademark of VisiCorp. 1-2-3 is a trademark of Lotus. MultiPlan and MS-DOS are trademarks of MicroSoft. CTOS is a trademark of Convergent Technologies. Unix is a trademark of Bell Labs.

Calendar

menting Personal Computers in the Corporate Environment. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held Nov. 21-22 in Boston and Nov. 28-29 in San Jose, Calif.

Nov. 17-18, San Diego — **Interconnect Japan.** Contact: Technology Analysis Group, Suite 102, 1424 16th St. N.W., Washington, D.C. 20036.

Nov. 17-19, Boston — **The Fifth Annual Northeast Business Computer Show and Software Exposition.** Contact: Northeast Expositions, Inc., 822 Boylston St., Chestnut Hill, Mass. 02167.

Nov. 17-20, Washington, D.C. — **The Semiannual Washington, D.C. Computer Showcase Expo.** Contact: The Interface Group, 300 First Ave., Needham, Mass. 02194.

Nov. 17-20, Chicago — **The Semiannual Chicago Computer Showcase Expo.** Contact: The Interface Group, 300 First Ave., Needham, Mass. 02194.

Nov. 18, Washington, D.C. — **Relational Data Base Design Techniques.** Contact: Friedman and Fuller Training Center, Suite 350, 11140 Rockville Pike, Rockville, Md. 20852.

Nov. 19, New York — **Working With IBM Computers.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Nov. 19, New York — **Basic Programming For Programmers.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Week of Nov. 20

Nov. 20-24, Dubai, Abu Dhabi — **The Third Gulf Computer Exhibition and the Gulf Office Exhibition.** Contact: Mabco, Inc., Mid-Asia/Africa Business Co., 739 Boylston St., Boston, Mass. 02116.

Nov. 21, Washington, D.C. — **State-of-the-Art Telecommunications.** Contact: Sheila Brayman, Associated Information Managers, Suite 470S, 1776 E. Jefferson St., Rockville, Md. 20852.

Nov. 21, New York — **CICS/VS DL/1 Interface Architecture.** Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

Nov. 21-22, San Francisco — **Datapro Update: "Data Communications Today."** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 21-22, Englewood Cliffs, N.J. — **Security Management.** Contact: Institute for Software Engineering, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Nov. 21-22, Minneapolis — **Personal Computer Local Networks.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424. Also being held Nov. 29-30 in Phoenix.

Nov. 21-22, New York — **Rational Data Bases: Fact or Fancy?** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 21-22, San Francisco — **Focus for the End User: Basic Report Preparation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 21-Dec. 12, New York — **Interpersonal Skills Workshop.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Nov. 21-23, Amsterdam — **Videotex Europe.** Contact: Online Conferences, Suite 3314, 133 Ave. of the Americas, New York, N.Y. 10036.

Nov. 21-23, San Francisco — **Data Communications for Microcomputers: Acquisition, Application and Implementation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 21-23, Washington, D.C. — **Fundamentals of Data Communications.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

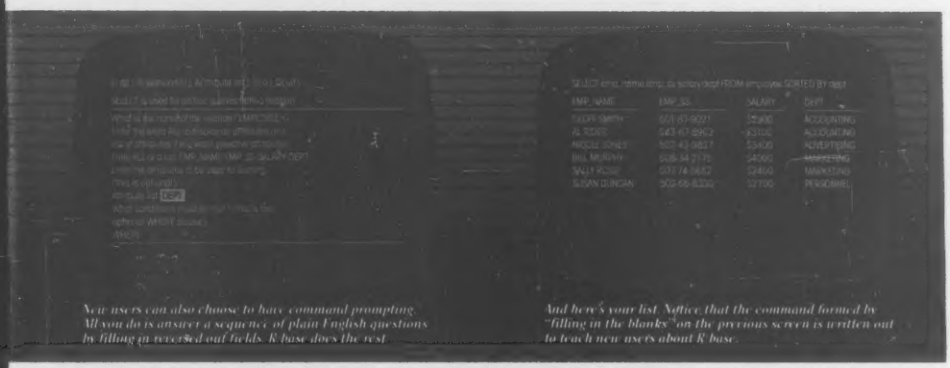
Nov. 21-24, Atlanta — **System Administration and Performance.** Contact: Technology Information Systems, 2305 E. Lincoln Drive, Phoenix, Ariz. 85016.

Nov. 22-23, New York — **CICS/VS Command Level Debugging.** Contact: Teltech, 39 Broadway, New York, N.Y. 10006.

Nov. 22-29, New York — **Data Communications Protocols.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Nov. 22-29, New York — **Computer Literacy: An Overview of DP for the Non-DP Professional.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

PURCHASING dBASE II,™ THIS FIRST.



New users can also choose to have command prompting. All you do is answer a sequence of plain English questions by filling in reversed out fields. R:base does the rest.

And here's your list. Notice that the command formed by "filling in the blanks" on the previous screen is written out to teach new users about R:base.

$500.00. And, because data entry verification rules are defined up front, you just can't put any "garbage in"—even if you try!

What's more, R:base allows you to sort and select data on up to ten different criteria, perform totals, and then display the results—all with a single, powerful command (see screens).

QUESTIONS? ASK FOR HELP.

The R:base HELP feature provides detailed information that describes every command and process required for complete mastery of the database. (As does our plain-English documentation.) For example, if you're not sure what SELECT does, simply key in HELP SELECT and R:base will tell you what the command does, how it works, even the proper syntax. This way you don't have to keep referring back to the user manual—it's all right there in front of you.

R:base + MULTIPLAN™ = POWER²

Unlike first generation microdatabases offering the "amazing" capacity of one file and some 60,000 records, R:base literally blows the lid off database size. You may never create an application using forty files with 100 billion records. But with R:base, you can.

Now imagine being able to tap all that power in conjunction with one of the most popular spreadsheet programs on the market today: MultiPlan. R:base is fully compatible with MultiPlan, so you can zip back and forth between programs without cumbersome file manipulation.

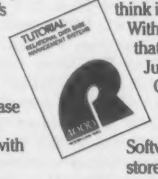
THE R:base PRODUCT FAMILY.

R:base™ 4000 is a single-user relational database (MS-DOS™ version is list $495). R:base™ 6000 is a multi-user version, available early 1984. In addition to MS-DOS, both packages will also be available in CTOS,™ with UNIX™ to follow.

The optional extended ReportWriter™ provides enhanced reporting and calculating capabilities (MS-DOS version is list $150). Program Interface™ is a set of subroutines which allows direct database access from PASCAL or FORTRAN programs (MS-DOS Version is list $395).

And what happens if you've already got dBASE II? Not to worry. It's easy to transfer your files to R:base.

FULL DEMO PACKET, $9.95.



Does all this sound too good to be true? If you think it does, let us prove to you that R:base is for real. With a comprehensive tutorial and demo diskette that will give you convincing hands-on experience. Just call our order desk at (800) 227-6703 (in California, 800-632-7979) and have your VISA or MasterCard number handy.

Better yet, hurry over to your nearest Software retailer or participating ComputerLand® store for an eye-opening demonstration.

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FREE 82-PAGE BOOK EXPLAINS TRANSACTION PROCESSING.

A new 82-page book, "SYNAPSE TRANSACTION PROCESSING SYSTEM OVERVIEW", clearly illustrates how a systems designer can accelerate development of a high-performance, fault-tolerant, on line transaction-processing system.

It discusses automation of integrity and recovery. Tells how to get performance from a Relational DBMS. Describes transparent expansion of a system on line. And it has a complete index.

The book presents a comprehensive, management-level introduction for the nontechnical manager. Yet it provides an adequate overview for the technical manager and staff.

To obtain a free copy, call (408) 946-3191. Or write: Synapse Computer Corporation, Corporate Communications Department CW, 801 Buckeye Court, Milpitas, CA 95035.

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EDITORIAL

The New Buzzword

Getting information from here to there has never been an easy task for users, especially those who are locked into a single vendor that aggressively protects its technological turf at the expense of a user's systems growth.

Computer vendors — like automobile manufacturers — have always thought that the best way to guarantee a dedicated user base is to build machines whose parts are only interchangeable with similar machines. If you want to add to your information fleet, you have to deal with the same firm or risk having a shop filled with systems that work separately, but are not on speaking terms with the rest of the family.

Fortunately, the situation is changing. Spurred by the standardizing motions of major computer vendors and the ominous shadow of "The Shakeout," a number of companies are building gateways from their computers to the computers of competing firms. In fact, "gatewaying" might very well be the buzzword of the mid-'80s as more firms learn that you cannot please all of the users all of the time without making a few technological concessions.

Two recent converts to gateways are Wang Laboratories, Inc. and Perkin-Elmer Corp. Wang, which has traditionally kept all of its equipment under the same technological umbrella, recently opened its communications door to office automation rival IBM by unveiling software that provides a gateway between its VS systems and IBM or IBM-compatible host systems [CW, Oct. 10]. The Massachusetts-based firm did this both to expand its customer options and base and, apparently, to fight IBM's systems juggernaut through an if-you-can't-beat-them-join-them compromise rather than an outright us-or-them battle.

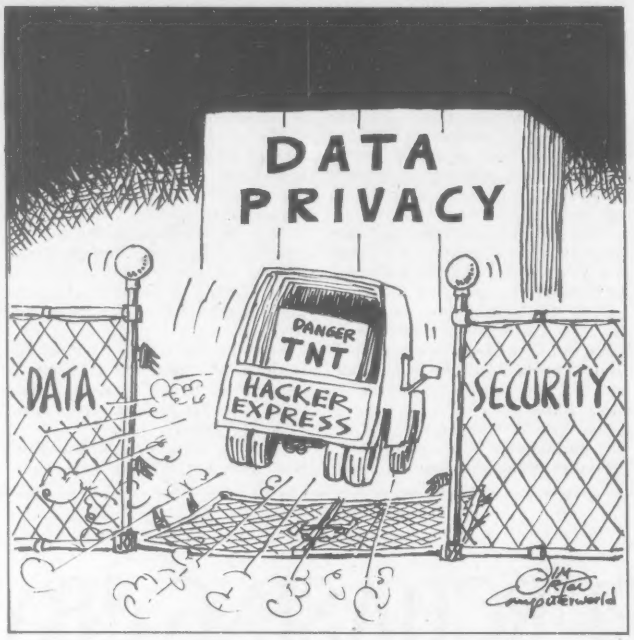
PE, a maker of 32-bit superminicomputers that has carved a respectable position for itself in the scientific computing arena, recently expanded options for its users by unwrapping products it collectively calls "Pengates." Simply, the software makes the firm's Series 3200 superminis compatible with IBM's Systems Network Architecture, Ansi X.25 and other IBM-supported protocols.

PE went one step further by announcing a plan to adapt its systems and peripherals to any present and future industry-accepted standards that might influence the buying decisions of users. Called Everywhere — a term that might prompt critics to charge PE with impossibly trying to be all things to all people — the plan would allow PE to piggyback accepted industry trends without appearing to be strategically fickle.

Cincom Systems, Inc. made its pitch for gatewaying recently by announcing an IBM-Digital Equipment Corp. connection that would allow users with both systems inhouse to bridge the communications gap between software programs. Cincom is reportedly the first software house to market such a product, which is called the Ultra Interactive Data Base System.

Finally, Stratus Computer Corp., a young but recognizable force in 32-bit fault-tolerant computing, this week announced software that ties its computers into IBM mainframe and Personal Computer systems. Termed the Stratus Office Solution, the software also places the firm's foot into the office automation market, as well as high-speed transaction processing. The strategy there, obviously, is to link the two, much like what vendors are also trying to do in the manufacturing and office markets.

The handwriting on the wall, or in this case the gate, is clear. Vendors and users have woken up to the fact that infrasystem compatibility is no longer enough to survive in the highly volatile computer industry. Gateways are being opened, and this time it is the user who is invited to make an entrance.



LETTERS

Public-Key Cryptosystems

Istvan Sebestyen's and Matthew Nimetz's In-Depth article "A Democratic Use of New Technology" [CW, Oct. 17] indicated a number of methods of using the public-key cryptosystems. However, it glossed over a fundamental problem: authentication during initial key distribution.

In the article, it is indicated that each user would "pick up the private key in person from the key administrator." In addition to the logistical problems of a million or more videotex users being required to pick up an initial public key personally, a more fundamental question arises.

Why not distribute private (data encryption standard [DES]) keys by the means indicated and have the key administrator also function as an on-line key distribution center, about which a great deal has been published? The question becomes even more cogent because of the time required to generate a public-key pair.

The article also indicates that key generation of a secure public-key pair ranges from 15 minutes to four hours. This seems extreme when a DES key can be generated in a few msecs, at most. Miles Smid, ICST, NBS, has described a secure method of generating DES keys. I have also developed a method. Smid has also described methods of using the DES to obtain public signatures.

The public key system as originally proposed seemed to solve the encryption key distribution problem. However, Needham and Schroeder ("Using Encryption for Authentication in Large Networks of Computers," Comm. Association for Computing Machinery, Vol. 21, No. 12, pp. 993-999) have shown that the logistics of key distribution is substantially the same for public and private-key cryptosystems.

If the initial public key distribution method does not provide some means of authentication, such as the proposed local key generation, which does not, the network is vulnerable to a pernicious attack. A penetrator can sequentially masquerade as "n" authentic users and request a change in public key from the key administrator for each of the users. At the least, this attack would create a chaotic situation and may result in subversion and compromise of confidential information on a vast scale.

There is a secure method of initial key distribution, registered mail or courier. The article indicates that this method is not required with public-key cryptosystems, but the article does not support the contention. If mail or couriers are required, the question arises: Why not distribute DES keys and avoid a number of the problems described in the article?

Marvin Sendrow
Advanced Computer
Security Concepts
Annandale, Va.

Data Gathering a Fact

James E. Gorman, in his letter to the editor [CW, Oct. 24], bluntly affirms: "Under no circumstances can any agency ... obtain access about [individuals] ... from Census records."

I must ask if he also believes in the tooth fairy.

U.S. intelligence and law enforcement agencies in covert operations use any means they must to get the data they need. These means have included theft, bribery, coercion, infiltration and the like.

I don't object to covert data gathering: Where our nation's security is at stake, the niceties of court orders must sometimes be evaded. National survival, in my opinion, takes precedence over technicalities.

Frank Sweet
Jacksonville, Fla.

HUMAN CONNECTION/Jack Stone‡

Getting DP Managers for Remote Mini Sites

For years, data processing centers have been struggling with the problems of supplying skilled managers for their branch office DP sites. These days the difficulties are compounded by several orders of magnitude as the needs have extended into the international arena. Here's how one major organization classifies the salient issues, preparatory to designing a comprehensive in-house recruitment and training program.

Applications systems are developed by the headquarters' systems and programming group and distributed as complete packages to field locations.

The field is, of course, responsible for installation, user training, operation and follow-on applications support. Assistance is provided in this regard from headquarters in principle, but in practice the field must operate more or less autonomously, since the line for such aid can be interminably long.

As is so typical these days, tight budgets have restricted the sites' DP head count to no more than a handful and often just one or two, plus the manager. Of course, overseas sites do receive local or area support from the equipment vendor for hardware repair and systems programming maintenance, which eases the manpower burden somewhat.

Since the program calls for minicomputer installations for several hundred sites over the years, the notion of recruiting skilled DP managers from the outside is completely out of the question. Instead, the firm is forced to select those with a propensity for the DP profession from within the organization, but without any prior experience in DP operations, and to train them appropriately, starting from the rock-bottom basics.

Selection Process

But how is the selection made? More specifically, in view of the miniscule staffing levels, is the position of DP manager for the remote mini site one that is primarily administrative, that is, applications installation, machine operations, user training and so on.

And what is "appropriate" training for such managers, anyway? Even more elusive is the subject of career ladders: Do the managers climb the rungs of administrative generalists or those of technical specialists?

Key field personnel within the organization have strong feelings that the managers should possess particular technical strengths to solve the day-to-day technical problems. In contrast, key personnel on the headquarters staff believe that the managers should possess more of a generalist's background to make them more suitable for rotational assignments in areas other than DP.

These opinions also are reflected in the various thoughts about a training program: Field personnel would like to see a substantial amount of time devoted to applications and hardware-specific subjects, whereas the headquarters staff would like to see a greater emphasis on administrative topics.

Training Needed

But there was fairly general agreement that candidates should receive training in such areas as general principles of business systems and computer technology; technological developments, particularly the rapidly converging thrusts of DP, word processing and telecommunications; and current systems and hardware operations procedures, at least sufficient to handle emergency situations.

The current approach to the training includes these general areas, among others: strong technical grounding in major applications areas, with emphasis on hands-on exercises using operational hardware and systems; presentation of the major functions of the DP manager and how the role may evolve over time; elementary programming; and basic systems analysis to gain an appreciation of the needs for user responsiveness.

The information presented above was derived from a preliminary study. If you are interested in a contact to receive additional information, please forward a self-addressed, stamped envelope to Jack Stone, P.O. Box 33699, Washington, D.C. 20033.

READER COMMENTARY/Milt Bryce‡

Information System Design Methodologies

The organizations that will excel in the 1980s will be those that manage information as a resource. Information resource management is the latest rallying cry for corporate America, one that has a noble, if familiar, ring to it. Unfortunately, if information resource management is the only criterion for success, very few organizations will excel in this decade.

Managing the information resource means, essentially, gathering, storing and processing data so efficiently and effectively that organizations produce the best information with which to make decisions and take actions, both on operational and corporate levels.

Millions of man-years have already been spent on this goal, as the computing community will attest, but we are pessimistic that it is anywhere near realization. Why?

To put it bluntly, most corporate executives and managers do not really understand information and information systems or how to build them — and, frankly, neither do most people in computing. If companies built bridges the way they've built information systems for the past two decades, this would be a nation dependent on ferryboats.

There are exceptions: Good systems have been built, and enlightened management can be found. In general, however, organizations continue to be plagued with complaints of information systems that do not meet the needs of users and are not easily adaptable to ever-changing requirements. As if that weren't enough, add severe cost overruns (100% is not uncommon), incessant delays, lack of standards, terrible or nonexistent documentation and modifications and maintenance that consume 85% of staff time. In the midst of all this, applications backlogs are mounting, and users are screaming and scheming to buy their own computers.

Attempting a Cure

We have been popping aspirins to cure these headaches. For instance, during most of the 1970s, the emphasis was on new programming techniques to improve productivity. The efforts were laudable, but misdirected. In fact, only 15% of good system development has to do with programming at all; the right program specifications will do more than all the techniques combined.

To solve these cost overruns and delays, management bought project management systems, which compounded the problem by adding a nightmare of controls and paperwork; the blame and effort were not where they belonged — on design.

Data base management systems were installed with the promise that they would help to realize the dream of the integrated corporate data base. But most of them have been little more than complex, memory-gobbling access methods; they have neither addressed the task of managing data nor the issue of handling organizational data that is not stored on a disk. Documentation aids and guidelines have proliferated. But isolated from, rather than integrated with, the process of system development, the documentation aids and guidelines have not solved the problem of people who will not document.

Some are beginning to see that these headaches are mere symptoms of a systemic disease: the total lack of the organization, structure and discipline to design and build good information systems with consistency. Without a sound, standard system design methodology, these headaches will never be cured, and the idea of managing information as a major resource will be a corporate pipe dream.

Black Art

Until very recently, system design methodology had been viewed as a black art, with each DP witch doctor serving up his own unique incantations and secret brew. Organized and structured ways to design systems do exist, but the black art misconception has persisted in part because most people do not really understand what information and information systems are.

System design methodology cannot be discussed without establishing a definition for what is being designed. That entails clearing up two basic misconceptions: Information is equated with data, and information systems are equated with computer systems.

Information is not data. Information is the result of processing data to gain insights from which to make decisions and take actions. Simple enough, but management has confused the two in communicating its information requirements to system developers. Far too many executives and managers are still asking for data and accepting reams of printouts from which they must distill the information they need to make decisions.

Why? There are two reasons. Analysts and programmers don't know how to ask the right questions, or they think they have the computer solution without asking. Managers, on the other hand, often will not (or cannot consciously) express what they need, for what purpose and when. The end user is seldom involved in or made responsible for the design of his information system. If he were, he would, no doubt, be more responsive and accurate. In fact, the user and the developer have somehow escaped true accountability to top management for their lack of communication and the often costly and inadequate results.

Equating information systems with computer systems is a misconception born of decades of preoccupation with technology. When management took information systems out of the hands of the systems and procedures people and gave them to the DP technical staff, the emphasis shifted from business processes to computer processes. What had top management done? Mostly out of fear of a technology it did not understand, it had abrogated its responsibility for the information it used to run its business. It then compounded the felony by isolating systems managers and developers from the mainstream, abandoning them to their disks and downtime. The wall of jargon grew and grew.

The crime is not that this occurred, but that it has persisted. Despite exhortations from the computer industry itself, most DP or information system managers have not been elevated into top corporate echelons or involved in business planning. So the emphasis has stayed on computer processes, and that must be reversed.

(Continued on Page 52)

Implementing System Design Methodologies

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The correct definition of "information system" is "a logically interrelated set of business processes that accomplish organizational goals." There is no "computer" in that definition.

The methods or tools of implementing a system are not (or should not be) even considered until after a logical definition and design are done. Information requirements drive design, and they dictate also what tools will be used to meet them.

Now that the computer has been driven out of the information systems equation, let's go back to the correct definition. It is a set of business processes. The meaning of "business processes" has also caused confusion. All too often, the DP department responds to requests to automate a department or a function, proceeding with a system designed in isolation from the rest of the company. Business processes are not departments or functions. They cut across such lines.

The foundation for building information systems consists of these basics:

- Properly defined information (not data) requirements are mandatory to the development of a sound information system.
- End users and developers must be held accountable for defining these requirements and developing systems to meet them.
- Information systems must be defined and designed from the standpoint of related business processes that cut across functional and departmental lines.
- DP or information systems management must be involved in top corporate business planning to manage the shift in emphasis from computer processes to business processes.

"System design methodology" can be defined as a complete logical method for developing effective systems to meet the information requirements of an organization. Without this broader perspective of logical — not physical — design, there is a tendency to develop systems that solve the wrong problems, produce voluminous and inappropriate data and concentrate on the implementation of DP technologies. Information systems are not DP systems; design methodologies that do not consider, equally, both manual and automated procedures are doing only part of the job.

Such a comprehensive methodology does not stop with analysis and design. It also encompasses these interdependent disciplines: data management, project management and documentation and communications.

What can an organization expect to accomplish with such a design methodology? From a business standpoint, it will be the development of a set of information systems that are models of how the entire business operates. Ultimately, all of an organization's data will be indexed and organized to meet user information requirements.

Systems Development Standpoint

From a systems development standpoint, such a methodology should:

- Significantly increase the productivity of analysts and programmers and, thus, the number of applications that can be developed in a given period.
- Cut down drastically on cost overruns and delays.
- Create data definition standards.
- Diminish system maintenance and modification time.
- Ensure thorough, accurate documentation.
- Improve the quality and effectiveness of systems.
- Dramatically increase the business knowledge of the developers in the management information systems (MIS) department.

This kind of integrated approach is an enormous undertaking, which is not to be underestimated. It must be adopted almost as a religion, as it will change corporate business systems and the DP professional's work life. It requries strong conviction because it takes time, hard work and patience to implement. During that time, belief can be weakened.

During this time, policy must mandate that all new systems development will be done using this methodology. Top management must support and continuously reaffirm this policy to keep both user management and DP management in line and to keep new managers from unilaterally deciding they are going to change things.

User management and end users of the system must be involved — by corporate fiat, if necessary — in almost every phase of system design and development, accepting the responsibilities of participation and approval assigned to them.

A good methodology will create systems prepared for change. So it must have rigid adherence to concepts and procedures, in every phase from design to implementation, test and audit.

Corporate and MIS management have a great deal to think about before implementing an information system design methodology.

Bryce is president of M. Bryce & Associates, Inc. in Cincinnati, developers of Pride-Automated System Design Methodology.

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Application Generators: A Dream Come True

By John M. Carney
Special to CW‡

For the past 10 years we've been deluged with the need for data base management systems (DBMS), data dictionaries and now application generators. Notice the order of the need: first came the DBMS, then came the data dictionaries to help us make some order out of our chaotic data and finally, for the poor programmer/analyst, application generators came along to increase productivity and free the masses from the bondage of maintenance programming.

What happens when you take the perspective from the other end? You start with the application generators. As the application is being defined by the analyst, definitions and interrelationships are built in the data dictionary. You begin with an overall view of the data structures needed by the appplication. A simple hierarchy or network structure is drawn up.

Menu-Driven Screens

Once the analyst has defined the basic data structure, he begins creating the application by defining data elements, combining related elements into segments that go to make up a record. All this is done through a series of menu-driven screens. Meanwhile, a complete data dictionary of the data structure is being built.

Having completed the data definition phase, the analyst then creates transactions against that data structure using the same type of menu-driven screens. A transaction is defined to input, change, delete or view the data structure. Once a transaction is defined, the analyst can begin working with the application by inputting test data through automatically generated screens still using the same program that is being used to define the system. At this point the analyst can quickly put together a menu of screens to show his end user what the application is going to look like.

The analyst is now ready to process this data. Traditionally, this is where the programmer comes into the picture with Cobol coding sheets aplenty and only second-hand knowledge of the application's processes from the analyst. Using a DBMS, the programmer may have a precompiler to help him access his way around the data base. The effort to implement the application goes into the programs-and-procedure code. The

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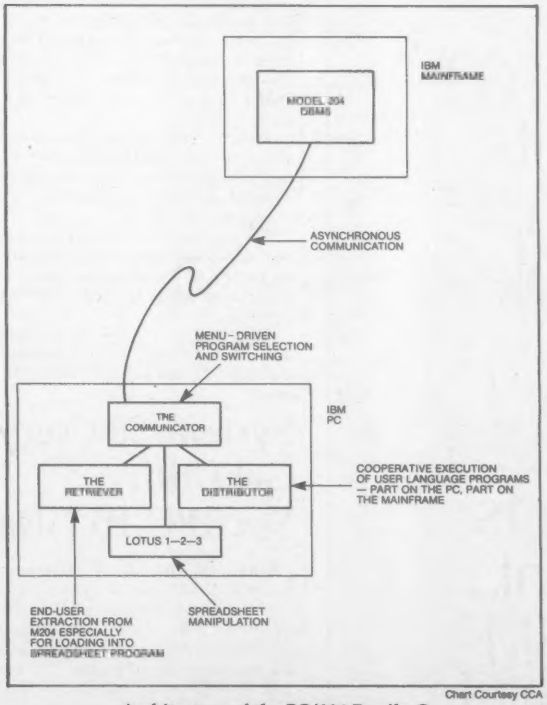

Chart Courtesy CCA

Architecture of the PC/204 Family C

CCA's 'PC/204' Links Its DBMS to IBM Micro

CAMBRIDGE, Mass. — Computer Corp. of America (CCA) has announced a link between IBM Personal Computers and CCA's Model 204 data base management system running on IBM mainframes. Called PC/204, the product is designed to optimize the use of mainframe data in microcomputer spreadsheets and includes a conversion routine to reformat data for use on Lotus Development Corp.'s Lotus 1-2-3 spreadsheet, graphics and data base management package for the Personal Computer.

PC/204 allows transparent access to the mainframe data base without connecting through a network or logging onto the operating system, a spokesman said. The user can extract data from the mainframe and convert it directly to spreadsheet format without rekeying.

PC/204 consists of four products:

- The Communicator provides the basic communications link between Personal Computer and mainframe and makes

(Continued on Page 62)

ADR Unwraps Release 1.1 Of 'D-Net'

PRINCETON, N.J. — Applied Data Research, Inc. has announced Release 1.1 of ADR/D-Net, a distributed data base system that makes data location independent of the program, operating system and teleprocessing monitor.

D-Net now provides distributed data base support for both batch and on-line ADR/Datacom/DB programs, a spokesman said. Batch and on-line applications can read and update Datacom/DB data bases while remaining insensitive to the physical location of the data.

(Continued on Page 58)

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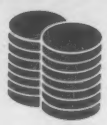

SDSI

Shared Dataset Integrity, SDSI, solves the inherent data integrity problems caused by the simultaneous access of the same data by more than one system without the use of device 'reserves'. SDSI greatly improves system performance by allowing the user to eliminate device 'reserves' from existing programs without any system or program modifications.

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Shared Tape Allocation Manager, STAM, automatically manages mountable devices, (tape and disk), in multi-CPU installations. Allocation decisions for shared device pools are made automatically, thus eliminating the potential for disastrous operator errors and more effectively using these valuable resources than is possible with manual control.

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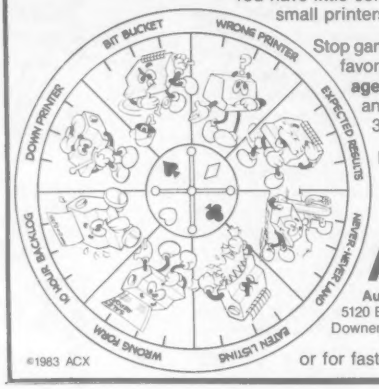

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Planning Tool Fits VM/370

WALTHAM, Mass. — BGS Systems, Inc. has announced Capture/VM, a capacity planning package for the IBM VM/370 operating system.

The company said Capture/VM will optimize both interactive response time and job processing volume. Reports generated by the package allow capacity planners to determine and correct imbalances in work load among system components, to identify the types and specific elements of use that cause system response degradation and to evaluate the results of corrective action.

The package is said to summarize performance data from the VM monitor and compile reports in user-determined categories. Standard reports include systemwide CPU utilization, I/O device usage, channel usage and response time by individual and group user identification. Capture/VM interfaces with BGS Systems' Info/Base and Best/1-VM capacity management software.

Capture/VM is priced at $9,000 from BGS Systems, One University Office Park, Waltham, Mass. 02254.

'Arsap' Release Runs on RSTS For PDP-11s

RIVERDALE, Md. — Gejac, Inc. has announced that Arsap, the firm's resource management and chargeback package for processors manufactured by Digital Equipment Corp., has been updated to run under DEC's RSTS Version 8.0 operating system. The product is aimed at users of DEC's PDP-11 line of minicomputers.

Features of Arsap include: project accounting, terminal accounting, the ability to generate system utilization reports and invoice generation, the vendor said.

The package can be used to control day-to-day operations, to monitor system utilization growth and to plan the resources needed for the future.

The RSTS version of the package costs $3,495. Gejac can be reached through P.O. Box 188, Riverdale, Md. 20737.

System/38 Users Get Utility For RPG-III Files

OAK BROOK, Ill. — Michaels, Ross & Cole Ltd. has announced Mrc-Maintainer, an IBM System/38 utility designed to allow nontechnical users to create and utilize RPG-III file maintenance programs. It is the fifth module of the company's Mrc-Query series.

Mrc-Maintainer is said to write all code necessary to create applications including data description specifications (DDS) physical files, DDS logical files, DDS display files and RPG-III file maintenance programs. It also adds files automatically to Mrc-Dictionary so that reports, retrievals and graphs can be created .

Other features of Mrc-Maintainer maintenance programs include Help key support, file edit checking, message file use, file look-up functions through "search" mode, full function maintenance (add, update, delete, inquire) and automatic audit trail. All programs generated by Mrc-Maintainer are fully documented.

Other modules in the Mrc-Query series include Mrc-Reporter, Mrc-Grapher, Mrc-Dictionary and Mrc-Retriever. They are designed for use with the IBM System/38 Release 5.0, and each module costs $1,140. Michaels, Ross & Cole is located at Suite 501, 1301 W. 22nd St., Oak Brook, Ill. 60521.

On March 31st, 1983, IBM announced that its new operating system, MVS/XA, was available for general release.

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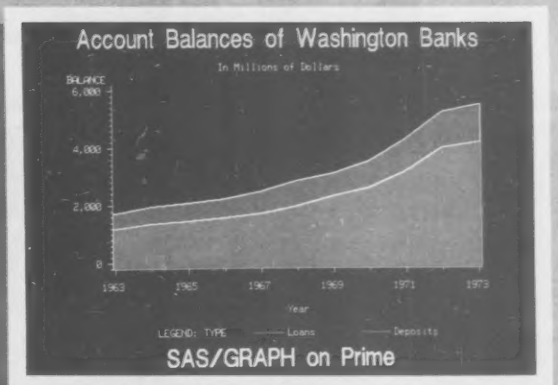

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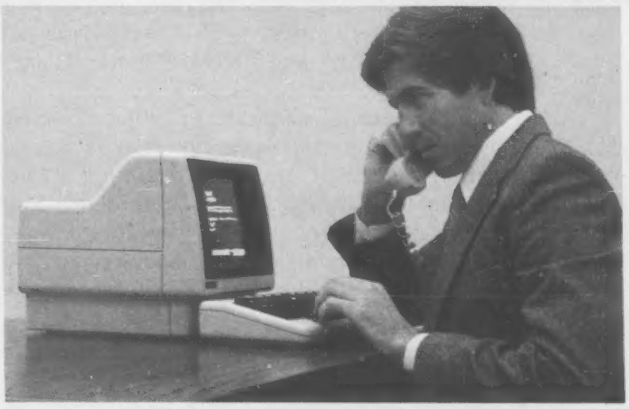

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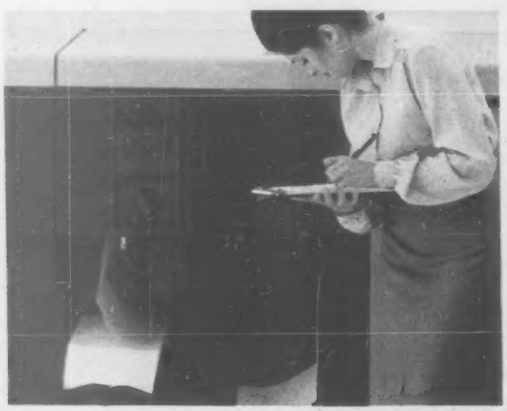

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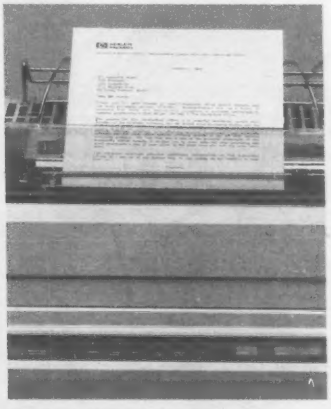

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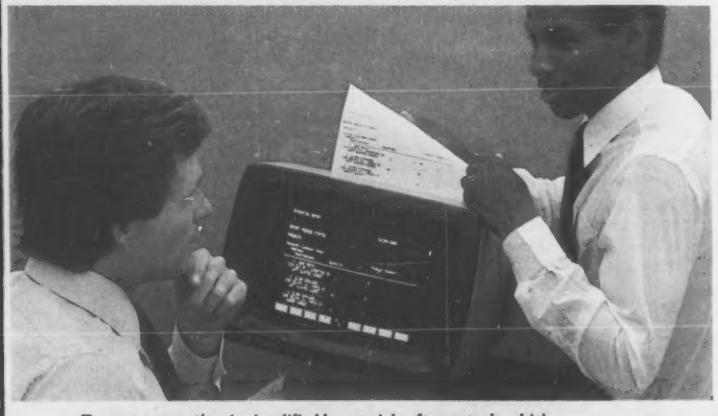

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ADR 'D-Net' Release 1.1 Features Distributed Support

(Continued from Page 53)

Data and programs can be moved within the distributed network without program modification, the company claimed. Datacom/DB support of D-Net also enables up to 999 data bases across a network to be concurrently accessible with full read, add, delete and update capability.

The new release protects data integrity across processor boundaries, the spokesman said. D-Net provides protection against loss of data integrity due to concurrent updates. It also provides synchronization of data across processor boundaries by building a level of integrity control greater than that provided by Datacom/DB in a single-processor environment.

The new release also features enhanced security measures, which allow administrators to restrict access at the file level. Through controlling information in ADR/Datadictionary, inquiry or update access from remote data centers can be disallowed.

D-Net operates in IBM 370, 4300 series, 30 series and plug-compatible environments and is available immediately. D-Net requires Datadictionary, which costs $34,200 under IBM's OS operating system; $28,100 under IBM DOS; and $21,100 under IBM 4321, 4331, 370/115, 370/125, 370/135, 370/138 or plug-compatible processors.

The permanent license price for the first CPU using D-Net is $37,500 for OS, $29,100 for DOS and $21,800 for smaller mainframes and plug-compatibles. ADR is located at CN-8, Rt. 206 and Orchard Road, Princeton, N.J. 08540.

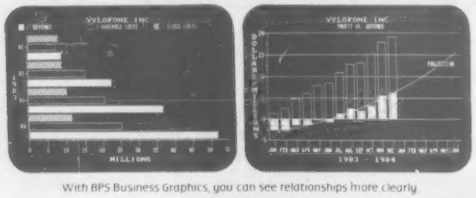
How to make these programs sing.

Most programs written for the IBM® PC or XT enable you to do amazing things with numbers. Trouble is, numbers don't exactly jump off the page.

Enter BPS Business Graphics.™ The graphics program from Business & Professional Software.

With BPS Business Graphics, you can take numbers from virtually any program you're now using—spreadsheet, data base, accounting, you name it—and turn them into bar graphs, line graphs and pie charts. *Without retyping a single digit.* You can even access text files created by a word processing program or down-loaded from your mainframe, and graphically manipulate them. So those numbers actually begin to mean something.

If you've already been introduced to graphics through 1-2-3,™ you'll be interested to know that BPS Business Graphics not only works with that and other integrated programs, but offers you additional power and flexibility.



With BPS Business Graphics, you can see relationships more clearly.

Functions like curve fitting and moving averages give you unmatched analytical capabilities.

And since BPS Business Graphics supports more than 80 popular printers and plotters, you can produce high-quality reproductions—even overhead transparencies—for your important presentations.

For more information, visit your computer dealer. Or call us, toll-free, at 1-800-DIAL-BPS for the name of the dealer nearest you. (In Mass., phone 617-491-3377.)

Soon, your numbers will be singing a whole new tune.

BPS BUSINESS GRAPHICS™
BUSINESS & PROFESSIONAL SOFTWARE

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Business Graphics is a trademark and BPS is a registered trademark of Business & Professional Software, Inc. *IBM and VisiCalc are registered trademarks of International Business Machines Corporation and VisiCorp, respectively. 1-2-3 and dBASE II are trademarks of Lotus Development Corporation and Ashton-Tate, respectively.

MVT/VSE Touts Full Support For IBM 4381

SAN FRANCISCO — Software Pursuits, Inc. has announced MVT/VSE, a DOS/VSE-compatible operating system the company said supports the full 16M bytes of memory available on IBM's recently introduced Model 4381 mainframe.

According to the vendor, when MVT executes on a processor with 16M bytes of memory, it sets the dynamic address translation controls to indicate 4,000 pages, allowing it to use the full high-speed buffer instead of only half. The company said IBM currently provides support for only half of the 16M bytes of storage available on the 4381 with DOS/VSE.

MVT/VSE is available for a monthly rental charge between $600 and $900 from Suite 800, 444 Market St., San Francisco, Calif. 94111.

Contel Offers 'Virtual RT-11' For VAX-11 User

BETHESDA, Md. — The Small Computer Systems Group of Contel Information Systems, Inc. has announced the Virtual RT-11 (VRT) package for users of Digital Equipment Corp. VAX-11 processors.

The package is said to be a high-efficiency emulation of DEC's RT-11 operating system, providing an environment that supports both runtime applications and program development. All RT-11 single-job applications and utilities will run under the Virtual RT-11 system, a spokesman said. An RT-11 license is not required unless DEC RT-11 utility programs are used.

The VRT package is available for $1,750 from Contel Information Systems, Small Computer Systems Group, No. 200, 4330 East-West Highway, Bethesda, Md. 20814.

MSA software makes your mainframe computer work 100 times harder than ever before

1. Now MSA's Executive Peachpak II™ software links personal computers to the mainframe. So you can...

2. Use your PC to access all your MSA mainframe systems, from General Ledger to Manufacturing.

3. Access entire mainframe files, so you can work with large amounts of information at one time.

4. Choose the exact mainframe information you need, as much as you need, in the form you need.

5. Use it with Peachtree Software, 1-2-3™ from Lotus, DIF,™ VisiCalc™ or other micro software.

6. Replace terminals with PCs at about the same cost–with many more capabilities.

7. Plug PCs directly into your existing online network...

8. Or establish dial-up access with regular telephone lines.

9. Interface mainframe data directly to typewriters, graphics plotters, and printers...

10. And automate your office economically.

11. Get this new technology in any of three specific packages...

12. Give executives the management tools they need with Executive Peachpak II...

13. Provide word processing and mainframe access to administrative assistants with Administrative Peachpak...

14. Give the graphic arts department direct mainframe access with Graphics Peachpak.

15. Save time because mainframe data is automatically loaded into your PC...

16. So you free up data processing resources...

17. And you don't have to key in data yourself.

18. Use MSA's Manufacturing System data to produce a cost/margin analysis with PeachCalc...

19. Make a capacity analysis using a PC and mainframe manufacturing information...

20. Summarize your findings in a report using PeachText...

21. Eliminate spelling errors with a built-in Spelling Proofreader.

22. Analyze overtime percentage on your PC, using data from MSA's Payroll/Personnel System...

23. Make timely manpower adjustments to maximize productivity...

24. And revise departmental salary projections on your PC.

25. Download vendor history from MSA's Accounts Payable System...

26. And use PeachCalc to do comparative analysis.

27. Use PeachLink to download information from both MSA and non-MSA online mainframe systems....

28. Create custom online formats with Easy-Screen™.

29. Or use standard formats provided by MSA.

30. Download a financial report from the mainframe to your PC...

Turn Page ▶

31. Add footnotes to a balance sheet using PeachText...

32. Project next month's income with PeachCalc...

33. Change sales estimates and recalculate income projections instantly.

34. Download names and addresses from your mainframe...

35. Use the List Manager and PeachText to do a mailing informing customers of a special announcement...

36. Or create a mailing to vendors requesting bids.

37. Using personal computer telecommunications, access up-to-the-minute exchange rate information...

38. Use PeachCalc for float analysis...

39. Display current exposure with a graph...

40. Update MSA's mainframe Foreign Exchange System.

41. Use PeachLink to distribute mainframe data to your other offices across the country...

42. Use a PC at those remote locations to print reports...

43. Graph expenses by location, department or by a single product line...

44. Print checks in remote locations from mainframe Accounts Payable data.

45. Create a salary administration worksheet on a PC using MSA's Payroll/Personnel System...

46. Produce a workforce utilization model using PeachCalc...

47. Monitor turnover using Business Graphics...

48. And, for a printed copy, route your Business Graphics output to a plotter or printer.

49. Use PeachLink to get economic data from MSA's Forecasting and Modeling System...

50. Use PeachText to prepare a corporate planning policy document...

51. Refer to a built-in Random House® Dictionary while writing the report.

52. Link to mainframes under operating systems OS, DOS, and SSX...

53. Use all standard online monitors, including CICS, IMS-DC, IDMS-DC, TSO, CMS and ICCF.

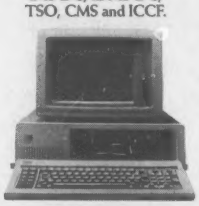
54. Assist your auditors by giving them access to mainframe data...

55. And the convenience of PeachText word processing...

56. Give them access to current customer and vendor information for letters of confirmation...

57. And an easy way to prepare notes to consolidated financial statements using PeachText.

58. Extract delinquent customer invoice information from your Accounts Receivable System...



59. Personalize a dunning letter with your micro software...

60. For help, call up 30 synonyms instantly using PeachText's Random House® Thesaurus.

61. Use mainframe Inventory and Purchasing data to graph inventory use by department on your PC...

62. Make a purchase order adjustment without leaving your workstation.

63. Download current balances from General Ledger to graph actual vs. planned...

64. Do a breakeven analysis by department.

65. Analyze overtime percentage by department on the PC using MSA's Payroll/Personnel System...

66. Use PeachText to prepare a memo summarizing your analysis and attach it to a graph.

67. Download employee data for an upcoming salary review...

68. Complete the salary review on your PC...

69. Enter the salary adjustment from your PC to the mainframe...

70. Make salary projections on your PC using mainframe payroll data.

71. Capture data from MSA's Fixed Assets System...

72. Use PeachCalc to create a lease amortization model...

73. Perform a TEFRA depreciation analysis.

74. Get database-to-database transfer with Database Sharing...

75. Download an entire report with the touch of one key...

76. Access it instantly, without data processing involvement...

77. Enjoy a realtime environment, no waiting for batch processing.

78. Access available funds data in MSA's Budgetary Control System...

79. Use PeachCalc to project expenditures through year-end.

80. Download data from MSA's Capital Expenditure Tracking System...

81. And analyze cash flows for an investment analysis decision.

82. Dial up subscriber databases to access current credit information for customers...

83. Use PeachCalc to analyze information and set credit limits...

84. And update your mainframe Accounts Receivable data.

85. Allow only authorized personnel access to the mainframe, due to built-in security.

86. Instantly express numbers in bar, line and pie charts or other business graphics.

87. Add footnotes to mainframe reports, or customize mainframe documents.

88. Produce up to nine different kinds of graphs and charts with mainframe information.

89. Get HELP if you need it, with a built-in feature that guides you through the system.

90. Organize your information and mailing lists with your own List Manager.

91. Use mainframe information with the Business Graphics System to produce slides and transparencies.

92. Work productively at home, by dialing up the mainframe from your own personal computer.

93. Make late changes to reports generated on the mainframe.

94. Do budget forecasting using PeachCalc and your PC.

95. Review profit and loss statements at a moment's notice on your PC.

96. Improve the productivity of your staff with simple-to-use software for personal computers...

97. Enjoy the convenience of a complete menu-driven system...

98. Use over 20 pre-defined applications from MSA.

99. Put this new technology to work for your company immediately...

100. Install it in less than one hour.

Backlogs? Rush requests? Now they're a thing of the past.

MSA's new Executive Peachpak II™ links your company's personal computers directly to your mainframe. So executives can get to vital information without waiting for print-outs.

Best of all, this hot new technology is available from MSA *right now.* (In fact, it's already working for companies across the country.)

Ideal for use with the newly announced IBM® 3270-PC

While other companies are still trying to work the bugs out of their initial offerings, MSA already has its *second* successful mainframe-to-micro product: Executive Peachpak II.

It offers such advanced features as Database Sharing, MSA's database-to-database transfer technology that lets you get all the mainframe information you need instantly.

And a Universal Interface with most micro software packages including Peachtree Software, 1-2-3™ from Lotus, and VisiCalc.™

Executive Peachpak II also includes PeachCalc,™ an electronic spreadsheet. A Business Graphics System for color charts and other graphics. Telecommunications that let personal computers talk to each other—or link to resources such as Dow Jones News/Retrieval.® PeachText,™ a complete report production system that lets executives edit and footnote reports. A List Manager for organization. And PeachLink,™ the software that links your PCs to the mainframe.

This mainframe-to-micro technology is also available in two other packages: Administrative Peachpak, which includes comprehensive word processing functions. And Graphics Peachpak, for color graphs and charts.

MSA's revolutionary new link means you can now deal with one software company that supplies all the advanced mainframe and micro systems your company needs. And the software that links them together.

Free personal computer...

...with your qualifying purchase of MSA mainframe software and Executive Peachpak II.

For details on how to get your free personal computer contact Robert Carpenter at (404) 239-2000. Or write "Free Computer Offer," Management Science America, Inc., 3445 Peachtree Road, N.E., Atlanta, Georgia 30326. This offer expires December 31, 1983, so act today.

MSA
The Software Company

Only MSA makes the mainframe link to personal computers this productive

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CCA Announces Data Base Link for IBM Micro

(Continued from Page 53)
applications resident in both systems available by menu selection. It employs block-mode communications using the CRC-16 protocol, which performs automatic error detection and retransmission of damaged data blocks.

- The Retriever enables end users to scan mainframe data stored in Model 204 and extract information for manipulation on the Personal Computer. It is designed especially for extracting data for spreadsheet applications, the spokesman said.
- The Distributor permits applications written in Model 204 User Language to be executed partly on the mainframe and partly on the Personal Computer.
- Lotus 1-2-3 is provided as an optional PC/204 product. Users may also use spreadsheet programs other than Lotus 1-2-3, the spokesman noted.

Shipments are scheduled for the first quarter of 1984. The CPU price for PC/204 is $10,000. The package consisting of the Communicator, the Retriever and the Distributor costs $750 per Personal Computer. Lotus 1-2-3 is available for $500 per Personal Computer. Model 204 costs $235,000 under IBM's MVS operating system, $195,000 under IBM's CMS and $150,000 under IBM's DOS. CCA is located at Four Cambridge Center, Cambridge, Mass. 02142.

Application Generators Filling a Dream

(Continued from Page 53)
data processing part of the application gets separated from the data.

To carry on with the application generator concept, why not let the analyst define the processes right with the data, where the definition belongs? Using the same tools that were used to define the data structure and transactions, the analyst can use a series of menu-driven screens to define the processes that will be used to manipulate the data when a transaction is entered by an end user.

The kind of processing that is available includes:

- Derived update to establish connections between segments or records and to automatically build inverted files.
- Local check to ensure that a field value falls in a given range.
- Local computation to calculate or update fields.
- External check to compare a field against a field in another file; for example, a table of state codes against a product file.
- Fetch operations to obtain fields from other segments or records.
- If-then-else processing to allow an operation to be performed based upon a certain condition.

As this process is being defined through the application generator, the system is documenting itself. A process is attached to or triggered by a segment, which is viewed by the user through a transaction. The analyst finds that by defining the processes that make up the application with the data, there is no need for writing procedure code.

What we have described so far is done through a universal transaction processor. The analyst uses the same vehicle throughout to define the data structure, transactions, processes and on-line forms. The end user uses this same vehicle to run his application — data entry, customer query or the like — on-line or in batch. The end user can request reports using English-language statements through this same universal transaction processor. If the report request is frequently used, the user can store the request in the same dictionary with the data definitions and applications.

Lastly, let's discuss maintenance. The user finds that a 25-char. field doesn't have enough room to hold the customer name and asks to extend the field to 30 characters. No problem. Just change the field length in the field definition, and let the application generator remind the analyst to change the field length in related segments and transactions. There is no need to reload the data base. The analyst can make additions without having to reload existing data.

The system uses Vsam, installs in one hour under VM/CMS or in less than a day under OS or DOS/VSE. After three days or so of training, a programmer/analyst can begin using the system productively.

This must be a dream. My alarm clock will go off any minute and I'll get up and resume my schema definition, mapping programs as I rush off to a special class for advanced Cobol programming methods.

This is not a dream. This is the way the industry is going with fourth-generation software.

Carney is technical director at Software Craftsmen, Inc. in Boston.

VS Series Gets System Package

OAK BROOK, Ill. — Business Model Systems, Inc. has announced Version 2.0 of the Business Modeler package for use with the Wang Laboratories, Inc. VS series.

A vendor spokesman described the package as a menu-driven, business management and decision support system that offers multiuser and multimodel capabilities.

The package is priced at $14,000 from Business Model Systems, 2625 W. Butterfield Road, Oak Brook, Ill. 60521.

WHAT TO LOOK FOR WHE
TRIES TO GET ITS F

For VAX-11s Running Unix

Relational Technology Offers Updated DBMS

BERKELEY, Calif. — Relational Technology, Inc. (RTI) has announced the Ingres VAX/Unix Version 2.0, an update of its relational data base management system for Digital Equipment Corp. VAX-11 processors running under Unix. The new release includes performance enhancements and three new application development tools.

Improved performance of Version 2.0 results from enhancements to the I/O subsystem, lock management and internal sort routines. According to the vendor, new query-update optimization strategies are provided for Quel, the Ingres data manipulation language.

Row size has been increased from 1K byte to 2K bytes; the maximum number of columns in a row has been increased from 49 to 127; and the data page size has been doubled from 1K byte to 2K bytes. Version 2.0 also supports multiple data bases on different disk volumes.

The three new application development tools available for VAX/Unix are Ingres/Reports, Ingres/Graphics and Ingres/Applications-by-Forms. All three use form-based visual programming interfaces, so that nonprogrammers can create reports, graphs and new applications without the problems generally associated with syntax-bound languages and applications generators.

The price for 750 or 780 system users is $40,000; for 730 users it is $20,000. The new applications are free to Ingres VAX/Unix users, with the exception of Ingres/Graphics, which is $500.

More information is available from RTI at 2855 Telegraph Ave., Berkeley, Calif. 94705.

Accounts Receivable Release Out for HP 3000, DEC VAX

TAMPA, Fla. — Collier-Jackson, Inc. has announced Release 1.05.A of the CJ/Accounts Receivable package for use with the Hewlett-Packard Co. HP 3000 and the Digital Equipment Corp. VAX-11 series of computers.

The package is said to be a data base-oriented, on-line, menu-driven accounts receivable system controlling customer account status for sales and collection analysis. According to the vendor, the new release incorporates multiple user-defined fields and a free-form comment field for customized reporting.

The package enables automatic tracking of customers through multi-divisional levels under a common customer number. It also includes a division/branch code through which reports can be requested without specifying a particular division or branch.

Release 1.05.A of the CJ/Accounts Receivable costs $12,000 for the HP 3000 and $14,000 for the DEC VAX-11 series from Collier-Jackson, 5406 Hoover Blvd., Tampa, Fla. 33614.

Resource Planning Package Targets 4300s, 30 Series

LEXINGTON, Mass. — Distribution Management Systems, Inc. (DMS) has introduced DMS-1800, described as a distribution resource planning package written in Ansi Cobol for use on the IBM 4300 series and 30 series mainframe computers.

The package is multilevel software designed for the forecasting, purchasing, production planning, finished goods inventory management and transportation scheduling operations of manufacturing and distribution companies.

DMS-1800 consists of four modules: forecasting, strategy, planning and execution. The forecasting module is said to establish estimates of product demand at each level of a distribution structure based on historical order data. The strategy module utilizes product information and historical demand data to compute and control safety stock and economic replenishment quantities.

The planning module can generate overall production and distribution plans based on data generated by the forecasting and strategy modules. The execution module provides information on the effectiveness of the production and distribution activities.

The complete system, with on-line capability, is priced at $182,000. The forecasting module can be purchased separately at $67,000 for batch or $75,000 for batch and on-line capability. The strategy, planning and execution modules can be purchased as a combination package for $115,000 from DMS at 81 Hartwell Ave., Lexington, Mass. 02173.

N A COMPILER COMPANY
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In a word, experience.

Ryan-McFarland compilers have been around almost as long as there have been computers that needed them. And that makes us stand out from those newer compiler companies in a lot of different ways.

Ryan-McFarland compilers set the standard in transportability. In fact, programs written with our compilers are so transportable that they can move from one brand of computer to another, from one operating system to another, and all the way from micros to mainframes without changing a single line of code.

Instead of constantly introducing state-of-the-art "breakthroughs," we constantly build upon what's worked for years. And instead of abandoning you after the sale, we respond to 98% of all requests for technical assistance within 24 hours.

RM/COBOL,™ for example, has been used to write more than 700 applications available from independent distributors and developers. And it's already working in thousands of installations. Our unmatched experience also went into the development of RM/COS,™ our multi-user operating system that makes business applications run more efficiently than any other operating system. And we're committed to building that experience into all our future products, too.

The way we see it, you've got a very clear choice: Go with one of those newer compiler companies. And enjoy the experiment.

Or go with Ryan-McFarland. And enjoy the experience.

RM/ RYAN-McFARLAND
OUR EXPERIENCE SHOWS.
609 Deep Valley Drive, Rolling Hills Estates, CA 90274, (213) 541-4828.

Enhancement of 'Adders' Announced by Rendeck

BOSTON — Rendeck Corp. has announced Release 3.0 of its Adders Data Entry on-line system for IBM CICS-based data entry systems.

New facilities include the ability to contain up to 30 screen formats in a batch, with each screen holding up to 20 records; control total capabilities allowing establishment of up to 20 hash counters and up to 10 document counters, each permitting totals of up to 15 digits; and cross-presence checking that provides some logic to checking for presence of a given field in an input record.

The package is available for DOS versions from $18,500 and for OS versions from $22,500. Rendeck is located at 5 Faneuil Hall Marketplace, Boston, Mass. 02109.

'Easyvsam' Fits IBM Mainframes In DOS/VSE Environment

LOS ANGELES — Easy-Soft, Inc. has announced the Easyvsam software package for IBM mainframe installations in the DOS/VSE environment.

Easyvsam can be accessed through any programming language, allowing programmers to use Vsam features not normally available with the higher languages, such as mass sequential insertion and backward processing, a spokesman said.

The system automatically handles all Vsam errors and prints the Vsam return code and error code upon program termination, permitting a programmer to pinpoint errors during program development.

A permanent license for Easyvsam is priced at $3,600 per installation, and a monthly license costs $180 from Easy-Soft, located at Suite 650, 601 W. 5th St., Los Angeles, Calif. 90017.

WP Package Targets System/34

WINSTON-SALEM, N.C. — Word Management, Inc. has announced Softword/34, a word processing package for the IBM System/34.

The Softword/34 text editor automatically breaks text into correct-length lines and permits insertion, deletion and copy commands. Text formatting features include centering, indentation and tabulation. Text can also be copied from any document stored on the system to the current working document.

Softword/34 can insert data from existing System/34 files into a master letter or document, allowing large amounts of customized letters to be produced. The user can select records from a file for letters and then sort the selections. Print options include printing multiple copies, line number and selected pages of a document.

The product costs $500 from the vendor at 535 E. Clemmonsville Road, P.O. Box 12068, Winston-Salem, N.C. 27117.

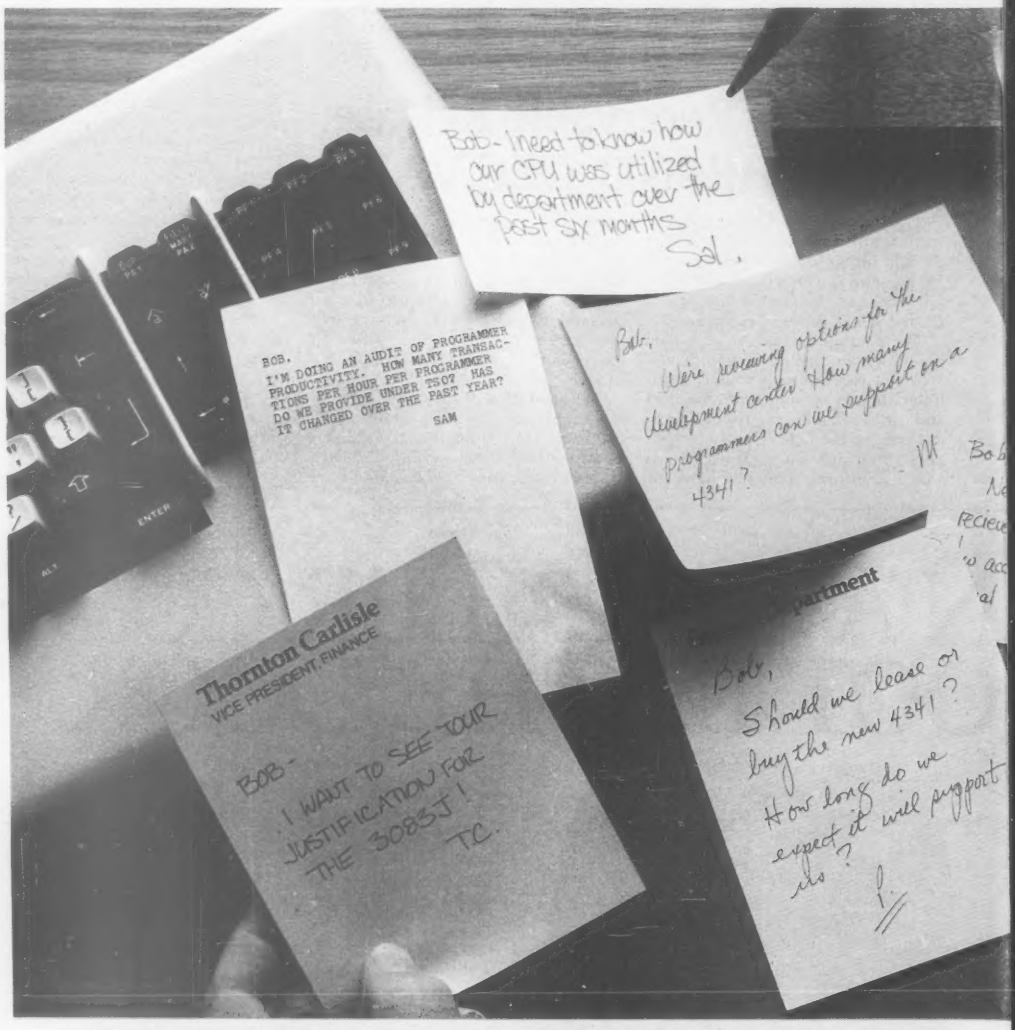
Version 2.0 Of 'Fetch' Unveiled

CENTEREACH, N.Y. — Axios Products, Inc. has announced Version 2.0 of Fetch, an asynchronous program loader for IBM CICS.

The major enhancement of Version 2.0 is the speed at which CICS tasks are loaded; it reportedly cuts the disk reads required to load programs by 60% to 70%.

Fetch can be started and stopped automatically during CICS start-up and shutdown. Each time Fetch is started, it optimizes the programs that are not permanently resident and that have been used at least once.

The price is $9,000 from Axios Products, 2364 Middle Country Road, Centereach, N.Y. 11720.



EVERYONE EXPECTS YOU TO HAVE THE ANSWERS. WITH BGS, YOU WILL.

Your company's multi-million dollar investment in data processing and data communications depends on how you answer questions. And you know that intuition, rules of thumb and seat-of-the-pants judgments are not the way. Intuition can no longer penetrate the increasing complexity of today's systems and networks. It can't provide the answers needed to guarantee agreed-upon service levels to your end-users. And it certainly can't produce cost-effective alternatives for future hardware needs.

BGS can. Only BGS has developed a *completely integrated system to manage computer capacity.* It enables you to analyze, forecast and model the performance of your host and data communications systems to get the answers needed for long-range planning and cost-effective control of your installation.

With the BGS family of software you can answer questions about how each workload uses the CPU and complex I/O configurations, allowing accurate system tuning. And for increased management control, BGS software provides trending, historical summary and exception reporting.

Further, BGS' systems include the most widely used modeling tool, BEST/1,™ to accurately forecast your system's performance. You'll know how your host and network will be affected by new applications, before installation. You'll be able to predict when response times will degrade. You can forecast precisely when and how you'll need to upgrade and expand, allowing you to evaluate hardware alternatives so that you can get the most out of your DP dollars.

And, to know how your host and network interact, BGS products serve as a complete, end-to-end host/network modeling

BGS...SYSTEMS FOR DP MANAGEMENT

CICS Transaction Dump Support Offered for MVS, OS/VS1 Users

MOUNT FREEDOM, N.J. — Macro 4, Inc. has announced CICS transaction dump support for IBM MVS and OS/VS1 users.

The Dumpmaster support traps CICS transaction dumps and writes them into its own self-maintaining disk file, from where they are available for examination and debugging as soon as the dump occurs.

Other features include a formatted display of the CICS trace table at the time of the dump; more than 30 CICS-specific diagnostic notes, autogenerated and displayed on-line with the dump; and a special CICS core display facility.

The cost for a one-month lease is $300. Leasing is available on a one- or two-year basis.

Macro 4 can be reached at 1 W. Hanover Ave., Mount Freedom, N.J. 07970.

Application Processor Out For DEC's VAX-11 Series

LITTLETON, Mass. — Pro-IV, Inc. has announced the Pro-IV fourth-generation application processor package for use with Digital Equipment Corp.'s VAX-11 line of computers.

The package is described as a multiterminal, multidata file development/runtime system that processes data files created by Cobol, Basic and Fortran, among other languages. The Pro-IV features report, screen, menu and update function-definition menus, on-line Help facilities and screen windowing. Applications on the package can be transported without modification across systems running Pro-IV.

Pro-IV offers a menu-driven application development process, a data dictionary, interactive screen and report definition, a self-contained application security system and automatically generated application documentation. The package can be purchased for $20,000 from Pro-IV through P.O. Box 595, 119 Russell St., Littleton, Mass. 01460.

'Esri' Package Incorporates Info DBMS

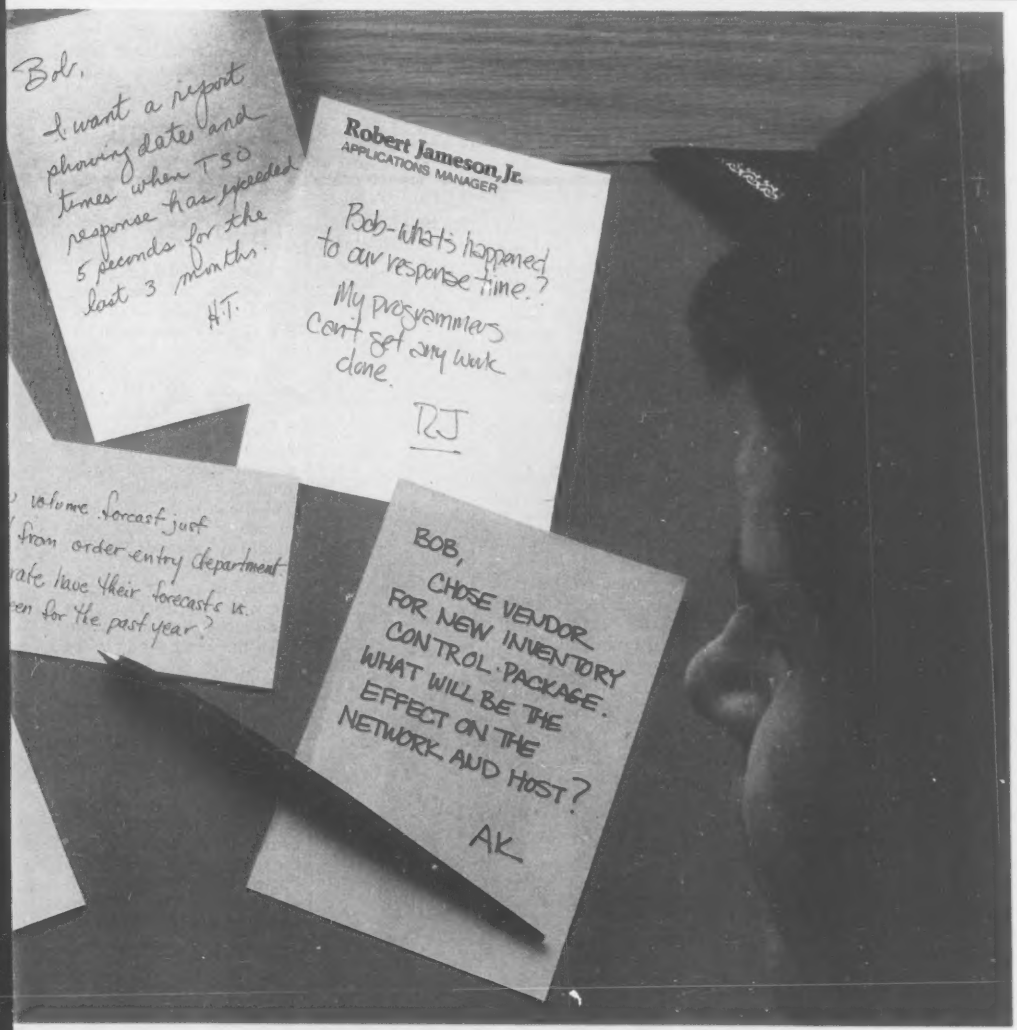
REDLANDS, Calif. — Environmental Systems Research Institute (Esri) has announced a geographic information system package incorporating Henco, Inc.'s Info data base management system.

Arc/Info reportedly combines geographic analysis and modeling capabilities with an interactive system for entry, management and display of spatial data. An Esri spokesman said the package features easy-to-use command language, digitizing and attribute entry. Spatial analysis tools reportedly include polygon overlay, point-in-polygon calculation and buffering.

The package runs on Prime Computer, Inc. and Digital Equipment Corp. VAX-11 series computers, the Esri spokesman said.

The product is available for $75,000, or $60,000 for users already equipped with Info.

More information is available from Esri at 380 New York St., Redlands, Calif. 92373.



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Allows Resource Sharing of Host

Virtual Disk Software Offered

RIDGEFIELD, Conn. — The Computrol Division of Kidde Automated Systems, Inc. has introduced virtual disk software that allows Digital Equipment Corp. RT-11 and RSX-11M/S-based real-time applications programs running in stand-alone processors to share the disk resources of a host computer that is running other applications.

According to Computrol, a full disk-based operating system like RSX-11M can run at the remote site without disks. The power bootstrap is performed automatically across the network, elminating the need for read-only memory-based satellite software. The satellite stations are linked with the host computer through a 1M bit/sec local network implemented with Computrol's Megalink processor-to-processor hardware.

Individual floppy disks at the satellite processors are replaced by files on the host computer disk. Network operations are transparent to the satellite applications programs, which continue to make standard I/O file requests. Up to 32 satellites can be accommodated, Computrol said.

Prices of the virtual disk software start at $1,000 from Computrol at 15 Ethan Allen Highway, Ridgefield Conn. 06877.

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In addition to its ease of use, the Displayphone terminal offers powerful data access capability. It is an asynchronous terminal that can also be configured to operate in IBM 3270 and other sophisticated computer environments. This flexibility gives users high speed access to a full range of corporate and public data bases.

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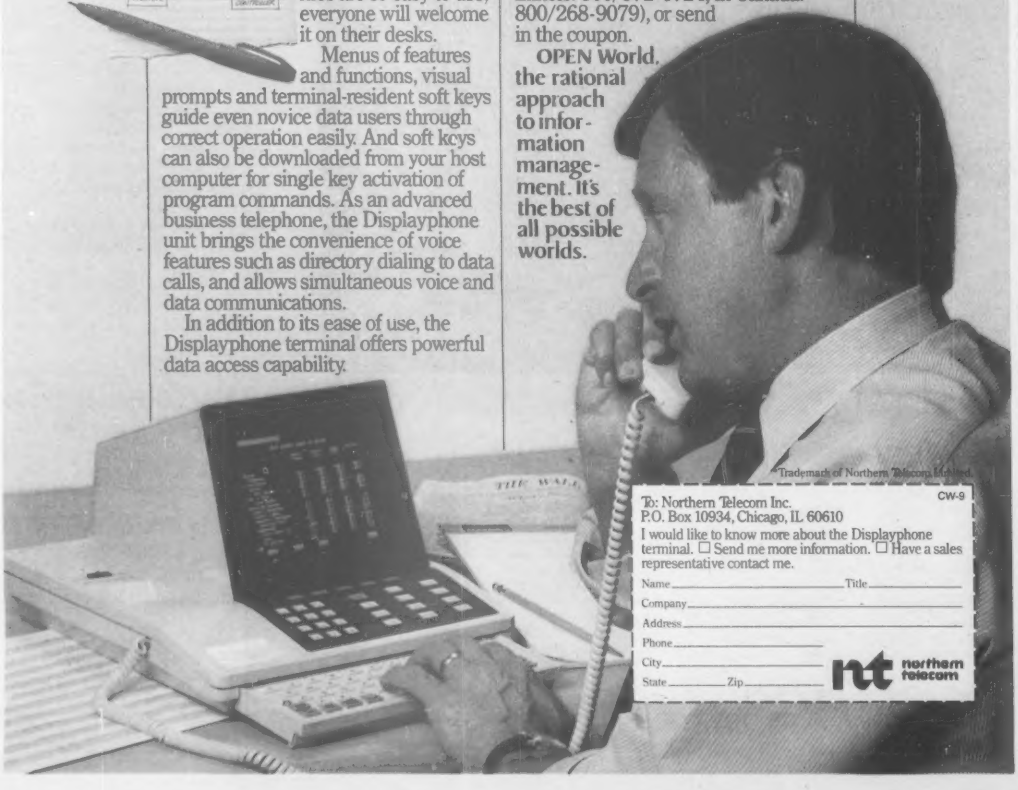

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Data Forms Created By 'Sofforms'

RIDGEWOOD, N.J. — Softest, Inc. has introduced Sofforms, a software product that allows a designer to create and display data collection forms. Softest has also announced The Menu System, a user interface to Unix.

Using Sofforms, the designer is able to tailor the user interface to suit the individual application, a spokesman said. Sofforms is written in C and will work on all Unix systems and systems that support C.

The first part of the package is the Forms Painter, a stand-alone program that enables the designer to paint the screen, creating forms with labels and input fields. The Forms Runtime System displays forms and fields, validates user inputs and responds to help requests.

The Forms Painter provides the designer creating or modifying a form with the ability to validate input to the form on a per-field basis. The designer has the option of specifying the order in which he would like the end user to step through the form.

Available immediately, the price for Sofforms on a single-user system is $500; on a multiuser system the price is $1,000.

The Menu System is an interface to the operating system's command language that is used to build and display menus in front of any program on the Unix or Unix look-alike system on any terminal, the spokesman said.

It allows the user to create and modify menus using English-like commands.

The Menu System is sold at $500 per CPU on single-user systems and $1,000 for multiuser systems from Softest, located at 555 Goffle Road, Ridgewood, N.J. 07450.

Wicat to Unwrap Irak Tool For Use on Its Equipment

OREM, Utah — Wicat Systems, Inc. has announced a version of the retirement accounts processing system, called Irak, available for users on the company's equipment.

Created by Employee Communications Services, Inc. of New York, Irak was designed to interface with a company's current account-based financial system, providing software for processing and controlling Individual Retirement Account, Simplified Employee Pension and Keogh retirement plans.

Implemented on Wicat equipment, some system features include audit trails and control totals, categorization of all types of credit and debit transactions, processing of various rate savings instruments, management-level evaluations of the expanded retirement account segment of consumer's savings and compliance with government regulations pertaining to retirement accounts, the vendor said.

The price begins at $10,000 from Wicat through P.O. Box 539, 1875 S. State, Orem, Utah 84057.

Camax Systems Unveils Tool As Data Link

MINNEAPOLIS — Camax Systems, Inc. has announced the Camlink package, said to provide a means of transferring design data from computer-aided design (CAD) systems to the company's Camax Graphics Design System hardware and software.

According to the company, Camlink is a one-way communications link from other CAD systems into the Camax system, allowing the transfer of design geometry from standard initial graphics exchange specification formats, as well as special formats generated by Ford Motor Co.'s and General Motors Co.'s CAD systems.

The package is said to allow for the correction of data errors that are present on the transfer tape, and it can accept data files of any size.

Camlink offers a Fordlink module that provides one-way communication from Ford's CAD system into Camax, and a GMlink designed to translate data output in General Motors format into geometry files in the Camax design systems.

The package is available for $7,500 from Camax Systems, 7225 Ohms Lane, Minneapolis, Minn. 55435.

Geisco Offers Turnkey Using IBM's Micro

ROCKVILLE, Md. — General Electric Information Services Co. (Geisco) has announced Easy*Claim, a turnkey system utilizing the IBM Personal Computer for insurance claim filing procedures for health care providers and insurance companies.

The system is a patient billing and receivables package, according to the company, and it will be marketed jointly by Geisco and Blue Shield Plans. Easy*Claim is said to provide physicians with control for accounts receivable.

Features of the system's Threshold software include aged receivables balance reporting, open item accounting, clinical analyses of patient diagnoses and procedures, referring physician analyses and appointment registration.

Easy*Claim has an initial one-time price of $20,000 including hardware, training, support and maintenance. Geisco is at 401 N. Washington St., Rockville, Md. 20850.

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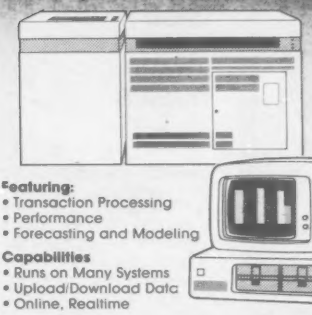

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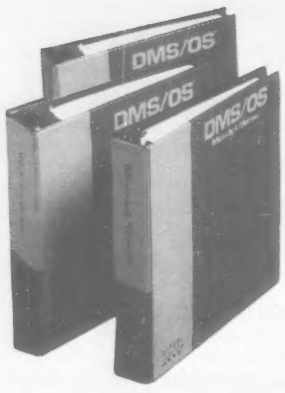

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Modal Analysis Program Gets Split-Screen Animation

CINCINNATI — Entek Scientific Corp. has introduced Emodal Version 2.0, a modal analysis program.

The new features of the program include split-screen animation of two modes, multiple orthogonal plus isometric views of the test structure, complex mode extraction and animation, increased animation speed, several levels of automated test setup, extensive Help features and increased speed of overall program execution. Emodal 2.0 calculates modal coefficients, modal parameters (mass, stiffness and damping) and animates the mode shapes on the CRT screen.

Nine methods of curve fitting are now standard in the program. All Emodal 1.0 users can upgrade to Emodal 2.0 with no changes to existing project files.

Emodal 2.0 can be used on the Hewlett-Packard Co. HP 200 series desktop computers interfaced to most popular spectrum analyzers for data acquisition.

The product is priced at $3,900 from Entek at Suite 316, 4480 Lake Forest Drive, Cincinnati, Ohio 45242.

Cobol File Editor Fits Sperry 1100

LITTLETON, Colo. — Electron Information Systems has introduced the Cobol File Editor (CED) for users of Sperry Corp.'s 1100 computer systems.

CED can handle field data and Ascii Cobol or binary data files. Some software features include search, display, examine, copy and edit Cobol data. Files can be copied or merged, in whole or part, depending on user input, the vendor said. CED also features autorecovery and a Help function.

The price is $4,650 from Electron Information Systems, 5554 S. Prince St., Littleton, Colo. 80120.

Medical Tool Utilizes Lanier 5000

ATLANTA — Lanier Business Products, Inc. has introduced the Lanier Medical Team, a new software package designed for medical records departments using the Lanier Business System Series 5000 computer.

The package is reportedly a chart management and transcription system that simplifies chart location. By typing in a medical record number or name, the location of a patient chart appears on the screen. The package also tracks incomplete or delinquent charts awaiting completion.

The system reportedly allows personnel to print reports identifying charts that are incomplete or delinquent. The package batch prints reports, such as histories and physicals, and it allows automatic line counting.

The Lanier Medical Team software also reportedly handles patient discharge lists, physician master lists, statistical productivity reports of transcriptions and selected lists of patients.

The package is priced at $4,995 from Lanier Business Products, 1700 Chantilly Drive N.E., Atlanta, Ga. 30324.

Mumps Users Group Plans College Donations Program

COLLEGE PARK, Md. — The Mumps Users Group recently announced a program to donate licenses to colleges and universities for use of the Mumps computer language.

The licenses, which will be provided by six vendors of the Mumps-based system, will be awarded on the basis of proposals to use the system for educational and research purposes, as well as on the qualifications of the applying institutes, according to Dr. Ruth E. Dayhoff, chairwoman of the Mumps Users Group.

A grant panel created by the organization's executive committee will review the proposals, and each institution awarded a license will be expected to produce reports suitable for publication describing the projects.

Mumps is a programming language and a data management system with powerful string-handling and file manipulation capabilities.

The vendors participating in the license grant program are Data Tree, Inc.; Digital Equipment Corp.; Harris Corp.; Intersystems, Inc.; Micronetics, Inc.; and Vista Computer, Inc. Institutions interested in participating should send proposals to Chairperson, Mumps Users Group, Suite 308, 4321 Hartwick Road, College Park, Md. 20740.

'Quickscreen' Bypasses Cobol

PORTLAND, Ore. — Rasmussen and Associates recently announced a productivity tool that reportedly provides users of NCR Corp.'s NCR I series minicomputers with a method of establishing file maintenance procedures without writing Cobol code.

A spokesman said the product, Quickscreen, operates in NCR's Imos III, Imos V, IRX and ITX operating environments. The product is an interactive maintenance program that reportedly allows maintenance to several interrelated files without exiting the program. It works with any indexed file and provides options for cross-file validations.

The product is sold on a one-time license for $2,500 from Rasmussen at 4838 S.W. Hamilton Court, Portland, Ore. 97221.

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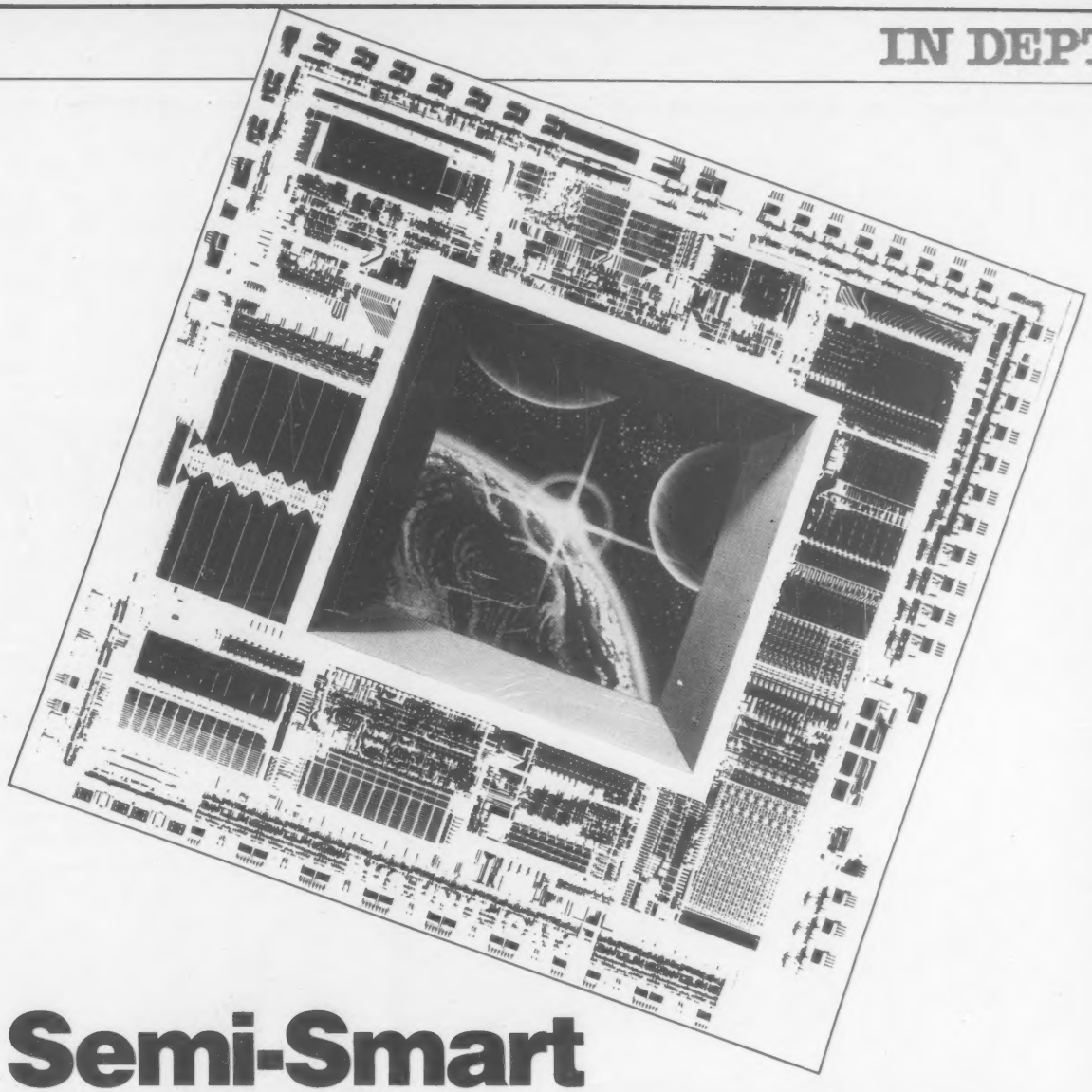

Semi-Smart

The Faster, Cheaper, Smaller World of Semiconductors

By Howard K. Dicken

Speed, cost and flexibility are the three primary driving forces in the computer industry. In less than 35 years, processing speed has increased by a factor of 100 million. This speed is typically measured in terms of operations or calculations per second. Cost, or more accurately the cost vs. performance factor, is as important as performance.

For all systems from micros to supercomputers, users want and sometimes need more performance. This demand translates to development of new semiconductor technologies.

Market forces and some of the semiconductor technologies developed in response have pushed performance to the point where new problems are now the limiting factor. The performance of the new circuits has created system packaging problems, including heat removal, a high package pin requirement and parasitic effects. Even at the speed of light, the signal delay between sections of the computer becomes critical.

These problems have set directions in new semiconductor technology for large computers:

- Higher speed devices with propagation delays of 10 picoseconds (trillionths of a second).
- More efficient gate design (power-delay products of less than 100 femtojules). Note: The efficiency of the human brain is 200 fJ. We are now designing and using circuits that are more efficient.
- The ability to perform more calculations on

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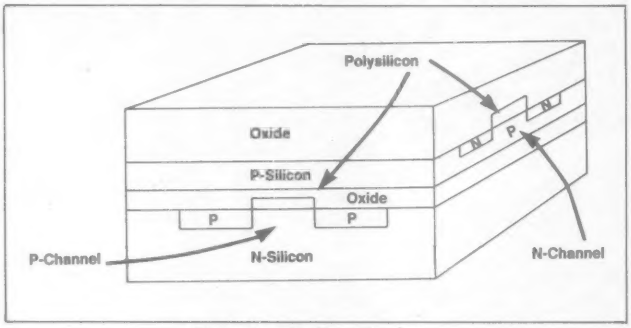

Figure A. 3-D Cmos Device

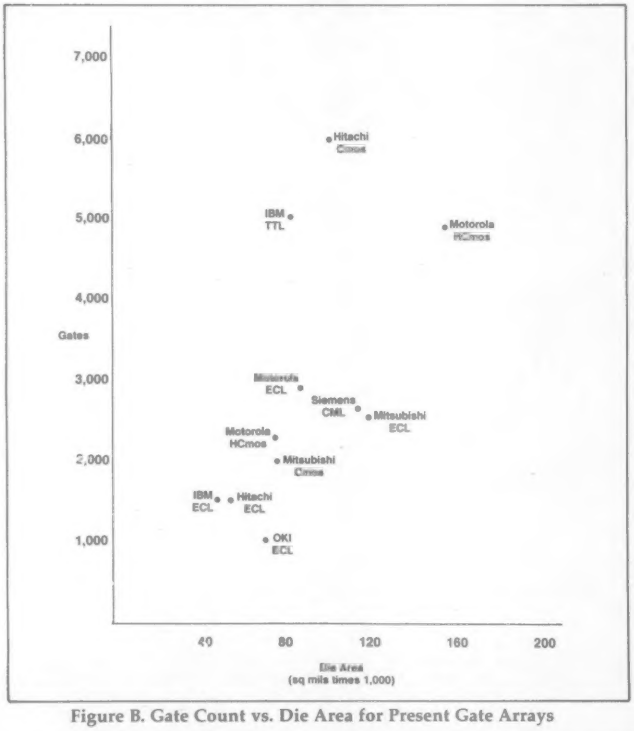

Figure B. Gate Count vs. Die Area for Present Gate Arrays

a single chip (VLSI circuits with die sizes of more than 150,000 sq mils [97 mm sq] will both reduce the signal path length and eventually reduce the pin count [Rents rule]).

Available Technologies

The available technologies include transistor-transistor logic (TTL), emitter-coupled logic (ECL), complementary metal oxide semiconductor (Cmos), gallium arsenide, Josephson junction and 3-D.

ECL and TTL are slowly being replaced by high-speed Cmos devices because of equivalent efficiencies and lower power requirements. Development work is continuing in both gallium arsenide and the high electron mobility transistor. Many in the industry, however, believe that because of various technical problems, the same development effort in Cmos or ECL would provide better performance.

The Josephson junction remains an unknown. Operational circuits have been made and the potential efficiencies are a factor of 1,000 better than present technologies allow, but because of technical requirements (cooling to the temperature of liquid helium), this approach is not in the immediate future. The most promising near-term winner is some advanced form of Cmos. One technology approach that might be applied to improve Cmos performance is 3-D.

Potentials of 3-D LSI

Although no standard form has been developed, the basic structure is shown in Figure 1. The key to developing this technology lies in the ability to create a thin layer of single-crystal silicon on top of the oxide that covers the lower device. The upper devices are then formed in this layer. The result, after the appropriate interconnections are completed, is two layers of circuits and more than twice the functional density on one silicon chip.

As with most other processing approaches, the basic driving force is the demand for lower system cost plus better performance, both of which result from higher component density.

In the case of 3-D, however, the initial interest lies in the potential of higher system speeds. The oxide layer can provide better isolation between components and thus increase the circuit speed by reducing the interacting parasitic capacitance.

An even more critical factor in this case, however, is the possibility of reducing both the length and number of interconnecting metallization

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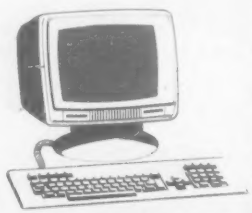

Call or send for DJC's 1983 Terminals Comparison Chart, as seen in Computer Decisions.

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paths between components and, thus, the major sources of capacitance. In some custom circuits, there is more than six meters of metallization per chip, which must be formed in three levels to allow for all of the necessary connections and crossovers.

The CPU system designers themselves need new technology to achieve better and more competitive computer performance.

At present, the major limitation is the quality of the second layer of silicon. Typically, polycrystal silicon is grown on the oxide (the same as for an MOS gate), and then it is melted to recrystallize into a single-crystal structure. Without the orientation of a silicon substrate, however, the grain size is not large enough for good device characteristics, such as high switching speeds.

Three-D circuits can rapidly become a major factor whenever this process is developed. Currently, several methods of recrystallization (remelting) are being investigated, including the use of laser beams, graphite strips and mercury arc lamps.

To meet flexibility requirements, the industry is turning to "semicustom" approaches, such as gate arrays. A gate array is one approach to obtaining a custom LSI circuit. This approach is simpler and lower cost than other techniques because it only requires changing the final interconnection patterns. This semicustom method, which can be applied to most technologies, allows prototype quantities in 12 weeks or less. In many cases, because of the high tooling cost for a full-custom design, gate arrays are used for the life of the product.

To meet flexibility requirements, the industry is turning to "semicustom" approaches, such as gate arrays.

Companies such as IBM have invested hundreds of millions of dollars in systems and manufacturing lines to customize computers to optimize performance for specific applications.

One example of the trend toward gate arrays is a new Motorola, Inc. circuit that uses a high-speed Cmos (HCmos) technology with 4,800 possible gates per chip. Hitachi Ltd., Siemens Corp. and Mitsubishi Electric Corp. have announced similar products. The result will be larger chips and more efficient and lower cost devices, which will allow continuing performance improvements in mainframes.

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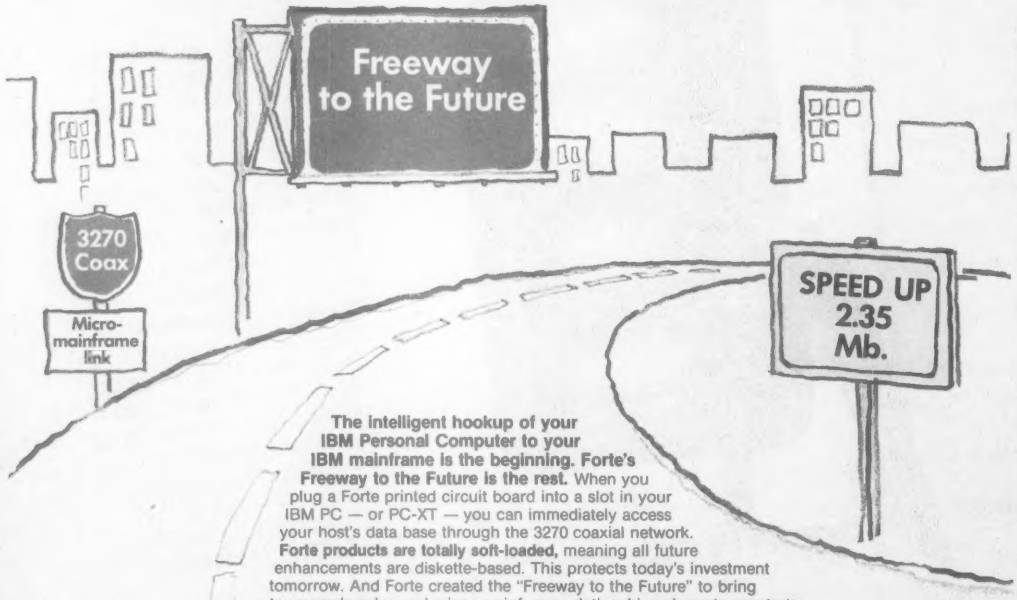

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A Look at the Semiconductor Cost Picture

For the last 12 years, the semiconductor industry has followed a pattern of 68%/year cost improvement for the price of a bit of semiconductor memory. For a 16K or 64K dynamic RAM package, the typical market price is now six millicents per bit. This cost trend will result in a price of less than one millicent per bit by 1989. The device will be packaged as a 1M-bit single-chip Cmos RAM.

During this period, designers have developed methods to perform the same circuit functions with fewer transistors. The function of storing one bit of memory is now performed with only one transistor, whereas four were required 10 years ago. The result is a reduction in cost by a factor of more than four, because of area and the improved yield from the simpler circuit.

During this same period, the diameter of the silicon wafer used in the processing has increased from 3 in. to 5 in. (Table 1). Because the labor and some of the other costs are the same regardless of wafer size, the cost per bit of memory in theory is reduced by the same factor as the increase in the square of the diameter. In this case, it is almost a factor of three (25 divided by nine).

The industry has been continually increasing the level of equipment investment to process the curcuits. The cost of new production modules has increased from the $10 million-to-$20 million range to between $70 million and $100 million (Figure 1). Much of this increase in equipment costs is for yield improvement. For a given circuit complexity, the yield can be increased by using better clean rooms as well as processing equipment that provides tighter control over device parameters. Also, more expensive equipment, such as projection mask aligners, is used to avoid yield-reducing damage by avoiding contact with the silicon

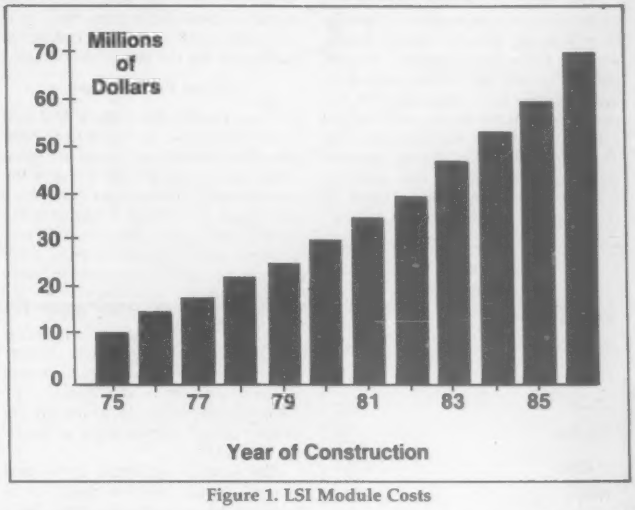

Figure 1. LSI Module Costs

Silicon Wafer Usage (Percent)

Diameter (mm)	1983	1985
50	3	—
75	25	2
100	50	25
125	20	47
150	2	25
200	—	1

Table 1

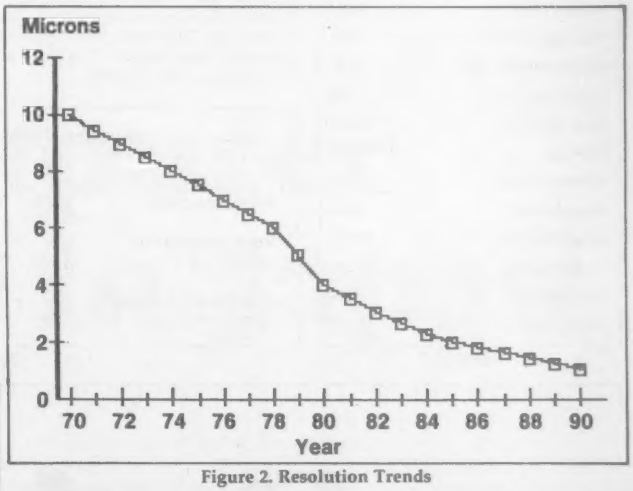

Figure 2. Resolution Trends

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IN DEPTH

wafers. The result is a yield increase (cost reduction) of a factor of three or more during this period.

The most important change has been a major improvement in resolution (spacing between lines). Again, as with the wafer diameter, because the cost of any device has a direct relation to the area occupied, any improvement in resolution will reduce the circuit cost by the square of the change. During this period, the typical process resolution has dropped from 10 microns to three (Figure 2), reducing the cost by more than a factor of 10 (100 divided by nine).

When combined, the four areas have provided the major mechanisms for reducing both circuit and memory costs. More important, it is expected that these trends can be extrapolated for the rest of this decade.

Actual Factory Costs

The critical cost factors and cost trends involved in the manufacturing of an integrated circuit are demonstrated by Table 2, which lists the average industry supplier's cost for a 64K dynamic RAM. The key to lower future costs is that after several years of experience, these same basic manufacturing cost values, with only small increases, will apply to the manufacturing of a 256K RAM. The result is almost a factor of four in cost reduction. Typically, these factory costs must be multiplied by factors of 1.5 or two to arrive at a typical market price. For example, today the average volume market price of a 64K RAM is $3.75.

The normal sequence for a new semiconductor memory design is to increase the complexity (bits) by a factor of four every three years. The last was the 256K design in 1982 and the next design expected is the 1M-bit dynamic RAM in 1985.

Actual Factory Costs (64K Dynamic RAM)

Processed Wafer	
Silicon wafer	$14
Depreciation	25
Labor	28
Supplies	34
Total	$101
Yield	78%
Yielded cost	$130
Total die on wafer	304
Electrical probe yield	37%
Probe cost	$8
Good die cost	$1.22
Package	$0.09
Assembly costs	$0.16
Assembly yield	92%
Assembled cost	$1.58
Final test costs	$0.08
Final test yield	86%
Factory cost	$1.92

Table 2

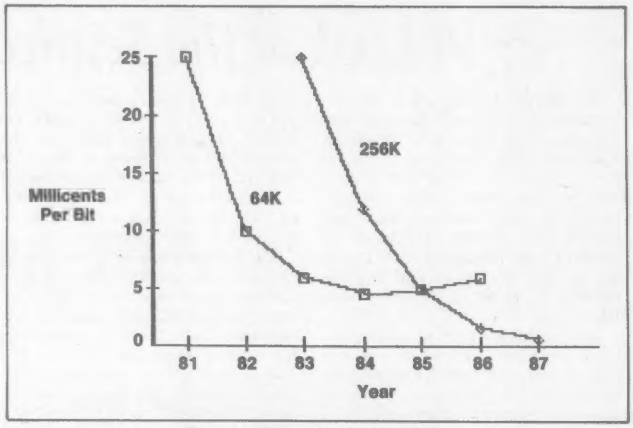

Figure 3. Dynamic RAM Prices

IBM, however, has just announced an experimental .5M-bit dynamic RAM, which is interpreted as an attempt to obtain an optimized design during the intermediate period. This device uses a double-poly, single-metal, n-channel MOS (Nmos) process with an average resolution of two microns. The speed is enhanced by using an extremely thin (25-nanometer) gate oxide.

No special effort was made to reduce the die size. The die area (160,000 sq mils) is still twice the size of the average 256K circuit. As a result, this circuit will have a useful economic life of only one to two years before the 1M-bit designs become cost competitive.

Th expected pricing trends, assuming a competitive market, will result in a crossover to the 256K devices sometime during 1985 (see Figure 3). For the 64K device, this crossover will occur when the market price is $2 to $2.50. The industry has been introducing new dynamic RAM designs approximately every three years (see Table 3). Improvements in cost have caused a market shift to the next design every two to four years. The shift to a 1M-bit RAM is projected for 1988 at a price of one millicent per bit.

Dynamic RAM Market Windows

	1K	4K	16K	64K	256K	1M
Initial prototypes	1970	1973	1976	1979	1983	1986
Price crossover to next circuit	1975	1979	1983	1985	1988	—
Cost per bit at crossover (millicents)	200	30	7	3.5	1	—

Table 3

About the Author

Howard Dicken is president of DM Data in Scottsdale, Ariz. The company specializes in high-technology consulting and interpreting technology trends for business management. Special areas of interest include semiconductors, computers and artificial intelligence.

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Computer Crime in Japan

Compared with the U.S., computer crime in Japan is embryonic. Such crimes as illegal program modifications and destruction or alteration of magnetically recorded data have not yet occurred. But the recent "Police Department White Paper" says that computer crime has the potential to significantly affect the nation's social order. The time for prevention: now.

Japan's National Police Department is beginning to note a new form of crime — computer and credit card fraud. Law enforcement agencies believe computer crime has the potential to affect significantly the nation's ability to maintain social order.

With the liberalization of data communications lines, computer usage will become increasingly sophisticated. According to a recently published "Police Department White Paper," this development could lead to an increase in unlawful activities involving computers and to the disruption of people's living styles or business activities through sabotage of vital computer functions.

The police department is investigating and attempting to prevent computer-related offenses. What follows is a summary of items relating to computer crime from the "1983 Police Department White Paper."

There are six types of computer crime (exclusive of automated teller machine [ATM] crime):

- Input of unlawful data.
- Acquisition of data and programs by unlawful means.
- Destruction of a computer.
- Unlawful use of a computer.
- Unlawful program modification.
- Destruction or alteration of magnetically recorded information, such as magnetic tapes.

The number of computer crimes has risen over the past few years (see Table 1 on In Depth/8). Of the 30 cases reported between 1971 and 1982, "unlawful input of data" tops the list with 22 cases. As for the type of person who commits the crimes, employees of financial institutions make up the majority.

Compared with the situation in the

This article originally was published in *Computerworld Japan* and appears here as part of the CW International News Network.

IN DEPTH

Type	Total	Year 71	72	73	74	75	76	77	78	79	80	81	82
Total (cases)	30	1		1	1	3	1		4	3		10	6
Illegal data input	22			1	1	2	1		3	3		6	5
Illegal acquisition of data/programs	4	1							1			1	1
Destruction of computer	1					1							
Illegal use of computer	3											3	

Table 1. Known Incidence of Computer Crime (1971-1982)

U.S. and other countries considered more "advanced" in computer-related offenses, the level of crime in Japan appears to be relatively embryonic. In Japan, "illegal program modifications" and "destruction or alteration of magnetically recorded data" have not yet occurred, but a good possibility exists that sooner or later they may.

The methods employed in "unlawful input of data" range from a relatively simple one of drawing cash by entering illegal data on a computer terminal to complex operations of an entire computer system. In other countries, crimes affecting human life or diplomatic relations have been taking place.

Software piracy is a potentially fertile area for breeding computer crime activities. There have been four reported cases of "unlawful acquisition of data/programs" with the intent of selling the items acquired. There have been cases in which the perpetrators of the crime intended to sell the items to overseas outlets and other cases where ransom was demanded for return of the stolen items.

"Unlawful use of a computer" means for an employee to make illegal use of the computer or the organization he works for or for an outsider to use the computer through data communications lines. With advancement of data communications, an increase in the latter type of crime is anticipated.

Control Method	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Offices (companies)	172	92	79	48	26	26	167	31
Percent implemented	38.8	20.8	17.8	10.8	5.9	5.9	37.7	7.0

(a) Entrance by outsiders permitted only in the presence of company staff.
(b) No one other than computer staff allowed to enter.
(c) Institution of a procedure to permit clear identification of those other than computer staff in the computer room.
(d) Establishment of required qualifications to enter computer room; requirement to wear badge or carry ID.
(e) Checking qualifications to enter at receptionist desk.
(f) Requiring signature in check-in/check-out log.
(g) No controls on entrance/exit.
(h) Other.

Table 2: Controls on Computer Room Entrance/Exit (1982)

Control Method	Totals	(a)	(b)	(c)	(d)	(e)
Offices (companies)	443	163	27	158	88	7
Percent implemented	100.0	36.8	6.1	35.7	19.8	1.6

(a) Done regularly
(b) Done occasionally
(c) Done when problems or questions arise
(d) No records kept
(e) No response

Table 3: Logging of Computer Operation (1982)

"Program modification" — to change the content of a processing program or a system operating procedure to make profits unlawfully or to damage the functioning of a system — has not yet been detected in Japan. In other countries, numerous crimes have been committed by those who have access to computer programs. There have also been instances where software has been modified by an outsider who illegally gained access to the computer program.

"Damaging or destroying magnetically recorded data, such as magnetic tapes" also has not been reported in Japan.

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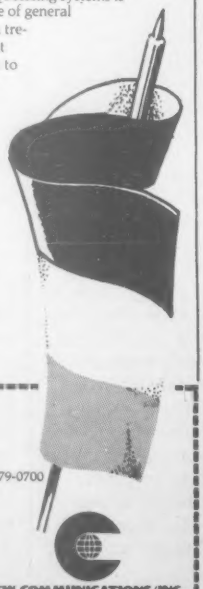

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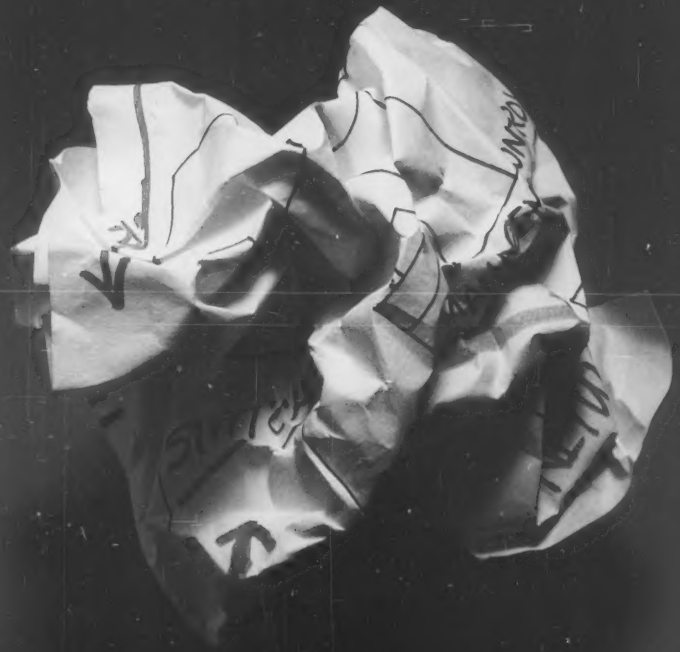

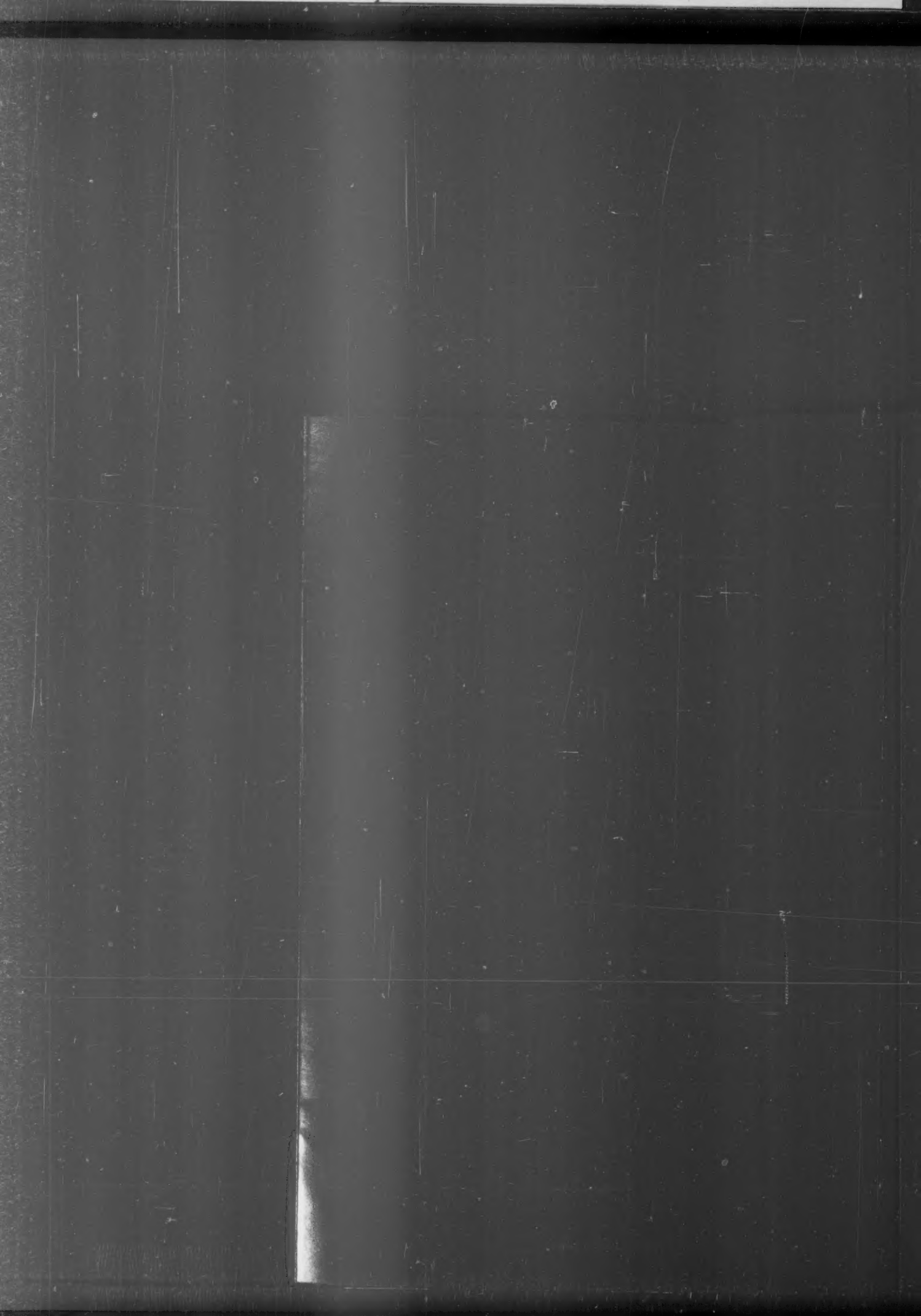

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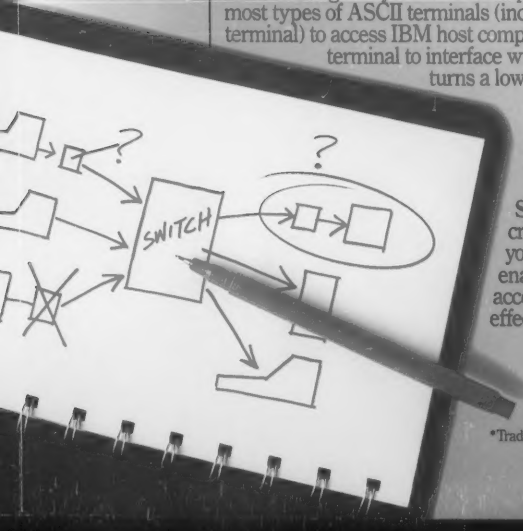

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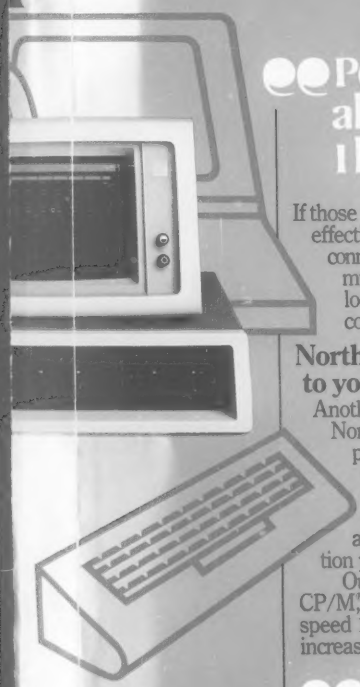

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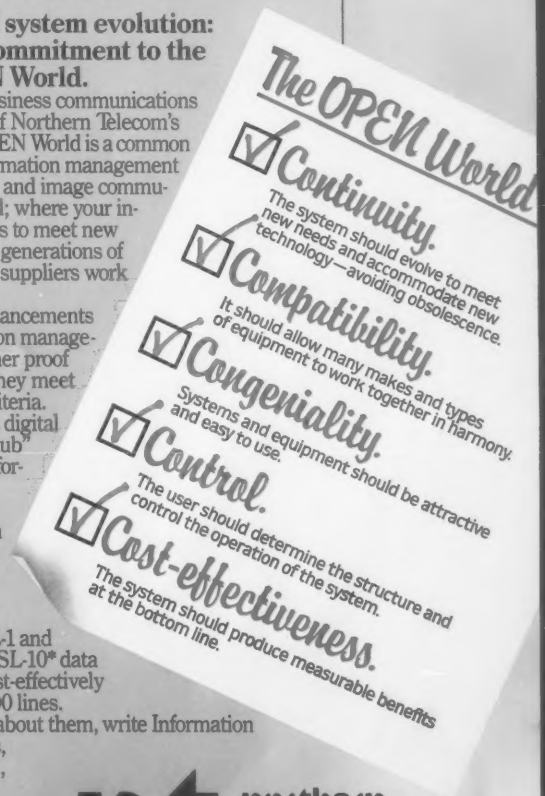

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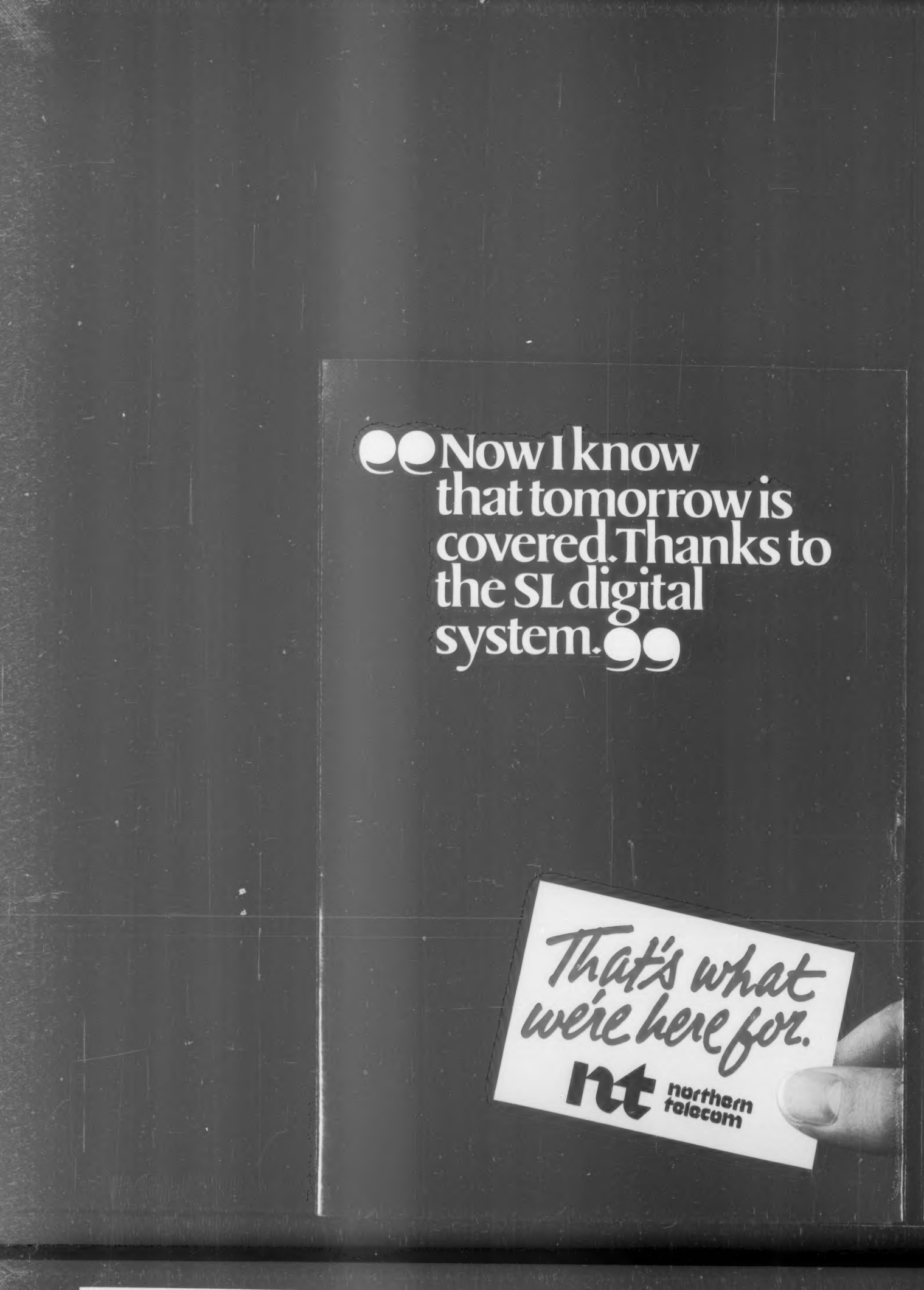
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CRIME IN JAPAN

IN DEPTH

In December last year the police department conducted a survey of crime deterrence measures being taken by businesses that use computers. According to that survey, a very high percentage of businesses, 69.1%, do not even control access to or exit from buildings or offices.

The percentage of businesses that have instituted control of entrance to computer rooms is illustrated in Table 2. A startling 37.7% of those surveyed indicated that their companies had no controls. At the same time, 20.8% reported that they admit no one to their computer rooms except staff members.

As for the use of security guards to check entrances and exits, 58.7% said they had a security guard; however, only a small percentage of businesses have placed a guard near their computer room entrance or have had that area patrolled.

When asked about computer operations and crime prevention through use of control programs, 56.4% of the offices surveyed claimed to have two or more full-time operators to run their computers. In 13.1% of the offices, however, computer operation is performed by individual part-time operators. Furthermore, only 17.2% of the offices have implemented a computer crime prevention program through use of control programs. Crimes that take advantage of these holes in computer operation management have become noticeable.

In terms of safeguarding peripheral devices, only 6.3% of the offices surveyed require use of a key and an identification code (operator number) for access to their computers.

In terms of safeguarding peripheral devices, only 6.3% of the offices require use of a key and an identification code (operator number) for access to their computers; the survey revealed that the majority of the offices have no controls of this type. Table 3 shows the status of data/program security management.

Although many offices place restrictions on who is allowed to handle computer access keys, less than half use a locked room or safe to keep the keys. Even fewer offices keep check-out records for the keys. Only 8.1% record the disposition of keys no longer in use.

Dealing With Offenses

In July 1982, the national police convened a "National Conference of Computer Crime Abatement Specialists" to provide guidance and to promote exchange of information on computer crime investigation. The national police is considering the development of personnel specially trained in this area.

More than half of the offices indicated that they feel a need for tightening up their security programs; however, more than 30% of the respondents said that making improvements is difficult because there are no adequate standards as to what measures are necessary.

Crime prevention is essential. However, according to the survey data, most business offices have inadequate procedures for deterring crime. Only 31.6% of the offices surveyed had any kind of crime prevention measures. More than half of the offices indicated that they feel a need for tightening up their security programs; however, more than 30% of the respondents said that making improvements in this area is difficult because there are no adequate standards as to what measures are necessary.

To promote crime abatement capabilities in view of these facts, it is necessary to ensure that each business has its own system of defense against crime. At the same time, the establishment of comprehensive standards for crime abatement relating to computer usage and operation

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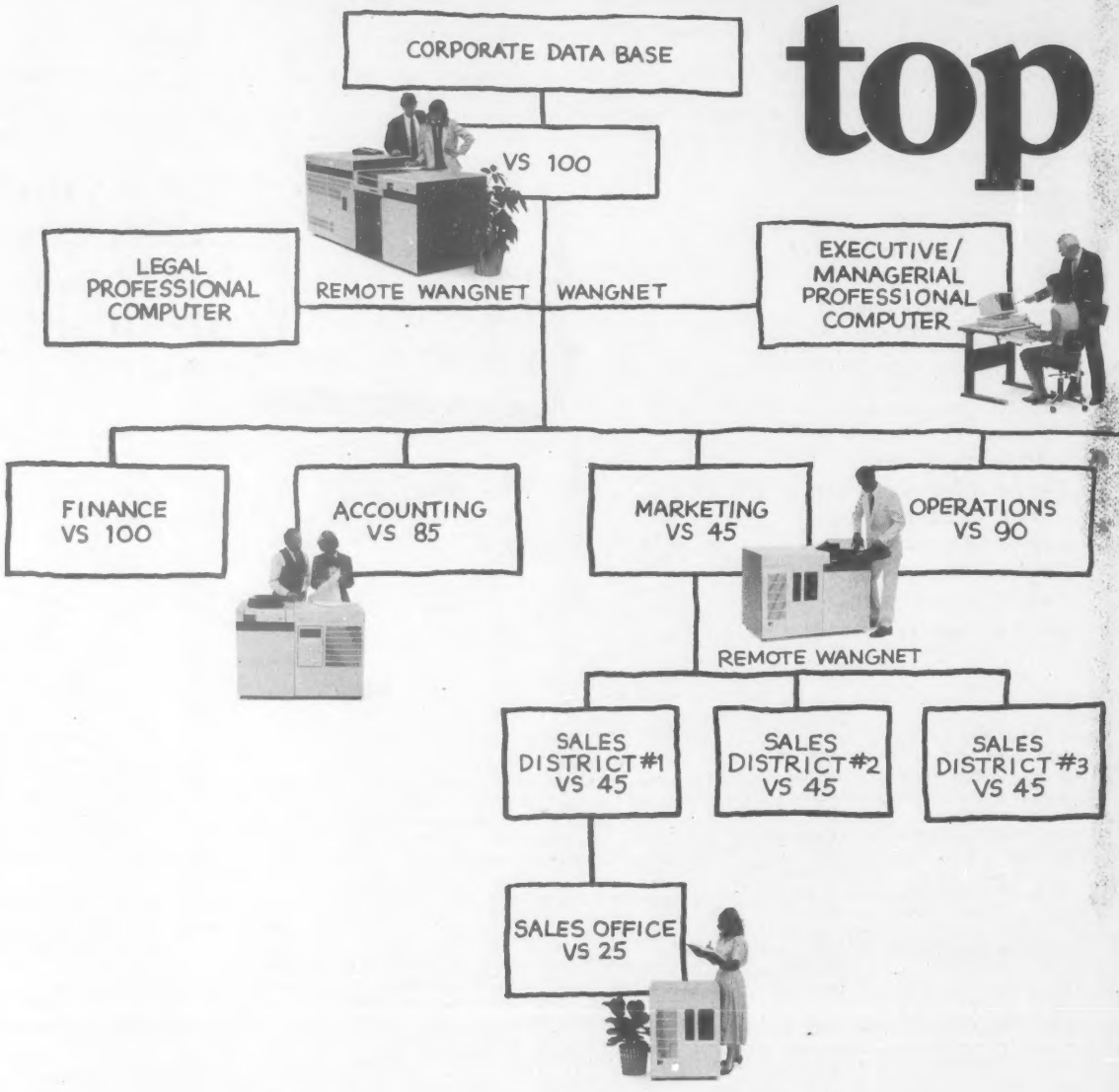

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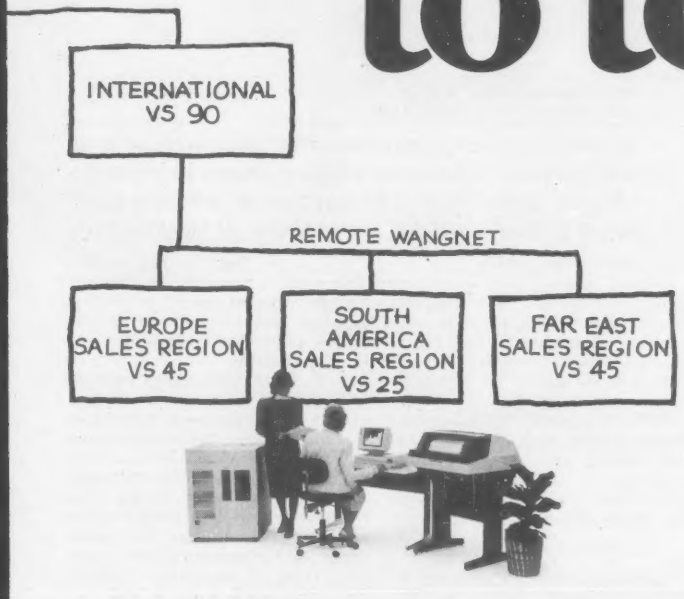

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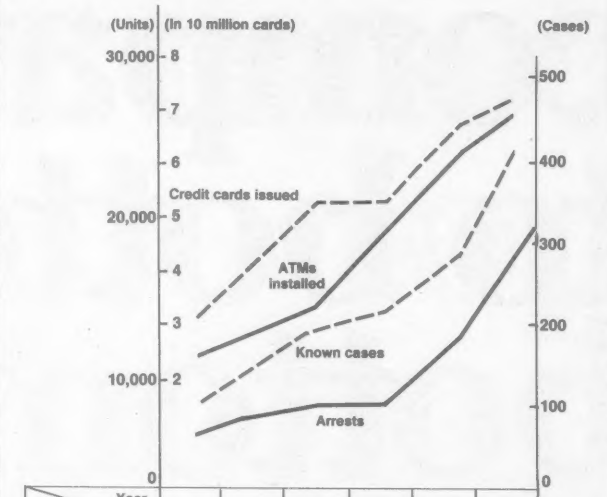

Breakdown \ Year	77	78	79	80	81	82
ATMs installed	10,127	11,758	14,138	18,928	23,627	27,310
Credit cards issued	2,414	3,700	5,129	5,216	6,645	7,397
Known cases	64	131	187	212	288	472
Arrests	40	72	94	99	179	321

Figure 1. Numbers of ATM's Installed, Credit Cards Issued and Trend in ATM-Related Crime (1977-1982).

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Gantt Charts	YES	NO
Multiple Bar Chart Formats	YES	NO
Multiple Line Chart Formats	YES	NO
Graphic Chart Library	YES	NO
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Executive Color Graphics Presentation Features	YES	NO
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A system has been installed so that information is retrieved instantly whenever a query comes in from police officers in the field. The number of referrals made during 1982 was 4,060,000, an increase of 900,000 from the previous year.

is urgently needed. Such standards should address needs for security personnel and physical facilities to ensure computer security. Beyond that, a Study Group on Computer System Security Regulations (established in November 1982) is conducting research on problems in criminal law dealing with computer crime and is studying the establishment of regulations aimed at protecting computer systems from abuse.

ATM-Related Offenses

Offenses connected with use of ATMs is rapidly increasing. The number of known cases has jumped from 64 in 1977 to 472 in 1982. The spread of ATM use, combined with inadequate safeguards for credit and identification cards, is leading to many incidents of ATM crime. Figure 1 shows trends in the numbers of ATMs installed, credit cards issued and incidence of ATM crime.

A rather unusual reported case involved gaining access to a data communications line to steal data for the purpose of forging credit cards. This incident shows that crime involving use of expert computer knowledge is also occurring.

Referral Operations

According to the "white paper," the police department is using computers for such purposes as checking a suspect against the list of wanted persons, administering drivers' licenses, comparing fingerprints and keeping statistics.

Lists of runaways, stolen vehicles and stolen goods are stored in a data base. A system has been installed so that information is retrieved instantly whenever a query comes in from police officers in the field. The number of referrals made during 1982 was 4,060,000, an increase of 900,000 from the previous year. The police department is considering including other types of information, such as drug cases, in the system as well.

In 1981, the department developed an automated fingerprint identification system. The effort to input fingerprint records in police files was started in October 1982. In October of this year, the department will begin to compare fingerprints taken at the site of a crime against this information base.

In addition, on-line referral and registration of drivers' licenses was initiated in January 1982. This has enabled the local community police departments to issue drivers' licenses the day applications are received and to speed up the process of license renewals. In April of that year, the computer was put into uninterrupted operation to permit drivers' license renewals on Saturday afternoons and Sundays.

COBOL

Input Validation

Will the fourth generation reach Cobol?

By Ken Meyer
John Piggott
Rod Grealish

A group of programmers and lecturers in England proposed a Cobol validation facility which was adopted in July 1982 by the Codasyl Cobol Committee into its Journal of Development. Yet the validation facility will not be part of the next Cobol standard. Supporters ask: "Why was this productivity tool ignored?"

Data validation can be a complex task in many applications. A program to validate data is usually the first one expected from a new recruit on a programming team or a trainee who has joined the firm fresh from school. It is difficult enough for him to understand the poor documentation he is given. But after eight compilations, the new programmer is told to change a field to admit a new condition or told that two fields have been combined into one.

Data must be checked to ensure its integrity in format and content and its relation to other data items. When a check fails, the application will require details of the failure. The format in which the data is received may not be suitable for further programs in the system, so the data may need conversion. Default values may need to be supplied in place of blank or invalid fields.

The validation facility, adopted July 1982 into the *Codasyl Cobol Committee Journal of Development*, provides all these functions within the Cobol language. Nevertheless, the American National Standards Institute (Ansi) X3J4 Committee, after reviewing proposed features for the Cobol-8X second draft standard, failed to adopt this tool into the standard at its London meeting last summer.

The committee gave several reasons for rejecting this

IN DEPTH

proposal. One was that the feature had not received enough publicity, so commenters on the second draft standard might not understand the power of the feature and it might not be acceptable.

The validation facility provides automatically for checking data format and content and relations with other data items. It indicates errors and distributes the data to other fields (converting format, if necessary). All validation specifications and error responses are incorporated in the data division. Validation is invoked by a single procedure division statement:

VALIDATE {identifier-1} ...

The VALIDATE statement may reference any group or elementary item, including a record-name (except those items defined in the report section).

The validation facility works in two cycles. Upon execution of a VALIDATE statement, the data is tested for format, and distribution to destination fields takes place. New values, including defaults, are placed in all destination fields, if indicated.

In the second cycle, content and relation validation takes place. The values placed in the destination fields in the first cycle may be used in relation checks in the second cycle.

When these first two cycles are complete, error indicators are set.

The validation facility provides automatically for checking data format and content and relations with other data items. It indicates errors and distributes the data to other fields (converting format, if necessary).

Format Validation and Data Distribution — Cycle 1. The contents of each elementary data item referred to in (or subordinate to) the identifier used with the VALIDATE verb are compared with the template provided in the corresponding PICTURE clause. Note that more than one identifier may be used in the same VALIDATE statement.

Each PICTURE character symbol has its own significance, interpreted with its USAGE clause.

For example, consider:

```
01 IN-RECORD
   03 ELEM-ITEM-1 PIC AAA99X.
   03 ELEM-ITEM-2 PIC 999.
   03 ELEM-ITEM-3 PIC Z(4)9.99-.
   03 ELEM-ITEM-4 PIC S99
      USAGE COMP.
```

Executing VALIDATE IN-RECORD on the record in the example above, ELEM-ITEM-1 should consist of three alphabetic characters (or spaces) followed by two numerics and then one character of any kind. ELEM-ITEM-2 should consist of three numerics.

ELEM-ITEM-3 starts with four numerics (which could, alternatively, have one or more leading blanks), followed by a numeric, a decimal point, two numerics and a blank or a minus sign.

"De-editing," a new feature of the Cobol-8X standard, would allow the validated value in this field to be moved to a numeric data item for further processing. ELEM-ITEM-4 has two numerics which have a sign indication according to the rules of the machine on which it is being compiled (and run).

Any mismatch between the input and the template in PICTURE results in rejection of the corresponding item on format. An elementary item that has failed format validation cannot be further rejected for content or relation, but a default value may be used, if required, in subsequent validation.

Data descriptions may be made to apply only under a specified condition by means of a PRESENT WHEN clause. Used with a REDEFINES clause, it enables the same area to be given more than one description. The several alternative data descriptions could follow the layout for different transaction codes, so familiar in commercial data processing. For example:

```
01 IN-RECORD.
   03 RECORD-TYPE PIC 9.
   03 FORMAT-1 PRESENT WHEN
      RECORD-TYPE-1 = 1.
      05 PIC X(27).
   03 FORMAT-2 REDEFINES FORMAT-1
      PRESENT WHEN RECORD-TYPE = 2
```

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```
OR 3.
05 NAME-1 PIC A (20).
05 VALUE-1 PIC 9(6).
05 PIC X.
```

In the example, if RECORD-TYPE is 1, then 27 characters from the computer's set follow. If RECORD-TYPE is 2 or 3, 20 alphabetic characters (including spaces) are followed by six numerics and a final arbitrary alphanumeric character.

If the REDEFINES clause is used without a PRESENT WHEN clause, the same area is validated according to only the first data description. Codasyl altered this point from the proposal.

Data Distribution in Cycle 1. As the data item is being validated for correct format, its contents may be optionally stored away in one or more locations (without a MOVE statement). This option is specified by writing a DESTINATION clause in the data description entry for the data item being validated. Any data transformation (or conversions) take place using the same rules as the MOVE statement.

A default value is stored in the destination item if the subject item is blank or if it is an elementary item that has failed the format test. Group items may also carry a DESTINATION clause, which is not affected by format errors. The default value may be specified through use of the DEFAULT clause, in the absence of which values of spaces or zeros are assumed as appropriate. For example:

```
03 IN-AGE PIC Z9
   DESTINATION IS STORE-AGE DEFAULT
   IS 18.

...
05 STORE-AGE PIC 99.
```

In this example, IN-AGE is a two-digit number or a single-digit number with a leading space. If it validates successfully, the "de-edited" version is stored in STORE-AGE, where the value can be used in computations.

A default of 18 is stored in STORE-AGE if IN-AGE is blank or contains an invalid value.

If necessary, the default value is used if the data item is referenced elsewhere; that is, in content or relation validation.

It does not replace the contents of the input data item. The contents of data items being validated are never overwritten.

The example in Figure 1 shows how the DESTINATION clause would act on two numeric and two alphanumeric elementary fields.

In the example, IN-RECORD contains !!23ABS!T (where ! stands for a space).

The validate facility distributes IN-RECORD as follows: IN-VAL-GRP, containing !!23, is moved to OUT-VAL-GRP. IN-VAL, containing OUT-VAL, has a PICTURE of $(4)9 and yields !!$23. IN-CODE-GRP, containing ABS!T, is moved to OUT-CODE-GRP.

IN-CODE-1, containing AB, is moved to OUT-CODE subscripted by 1, and IN-CODE-2, containing S!T, is moved to OUT-CODE subscripted by 2.

OUT-RECORD will contain !!23!!$23ABS!TABST upon completion.

In a second example, IN-RECORD contains !!!!!!!! and, after distribution, appears as !!!!$9999!!!!!!ZZ in OUT-RECORD. The 9999 and ZZ are inserted as a result of the operation, with the DEFAULT clause.

Savings in Cycle 1. The savings in Cobol coding in the first two stages, format validation and distribution of data to outputs and work areas, are

```
01 IN-RECORD.
   03 IN-VAL-GRP DESTINATION OUT-VAL-GRP.
      05 IN-VAL PIC ZZZ9 DESTINATION OUT-VAL DEFAULT 9999.
   03 IN-CODE-GRP DESTINATION OUT-CODE-GRP.
      05 IN-CODE-1 PIC AA DESTINATION OUT-CODE (1).
      05 IN-CODE-2 PIC XBX DESTINATION OUT-CODE (2) DEFAULT "ZZ."

01 OUT-RECORD.
   03 OUT-VAL-GRP PIC X(4).
   03 OUT-VAL     PIC $(4)9.
   03 OUT-CODE-GRP PIC X(5).
   03 OUT-CODE PIC XX OCCURS 2.
```

Figure 1. DESTINATION and DEFAULT clauses aid distribution.

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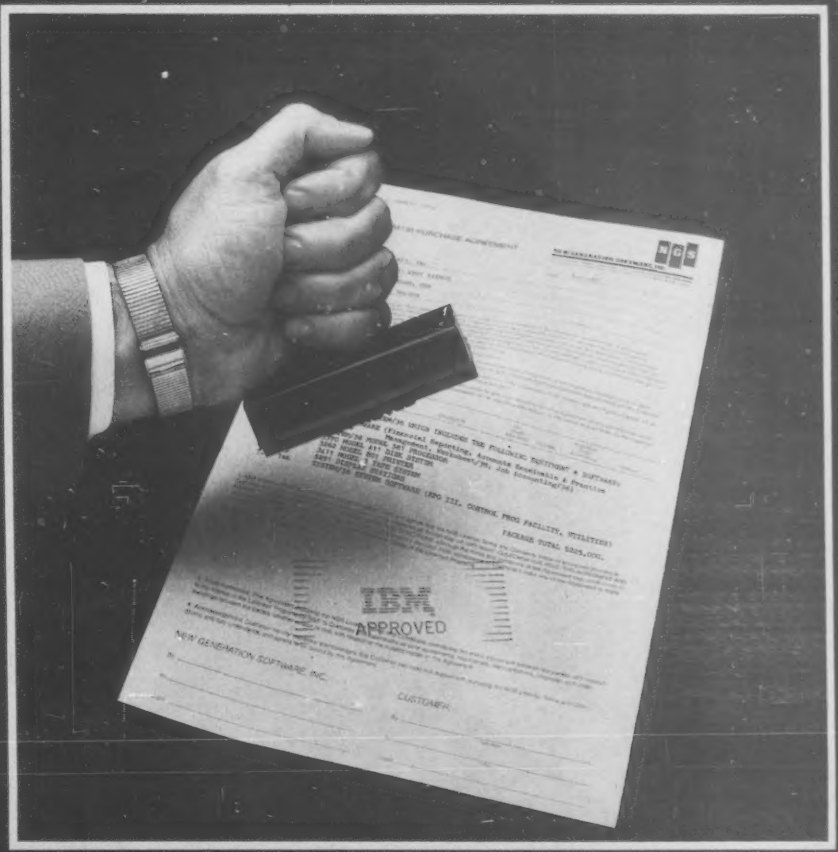

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IN DEPTH

alone worth the addition of the VALIDATE verb to the language. The tests that are accomplished would require many IF statements over an input area handled with a subscript on each field.

X3J4 has helped to structure the IF statement with the END-IF, but has not reduced the problems of confusing interpretation of complex IF statements. The solution, we think, is to reduce the number of IF statements in a program.

The number of MOVE statements required to store the information being validated also is dramatically reduced. Every MOVE statement eliminated results in fewer statements in a program. The concept is not new in Cobol, as the report writer feature has had (for some 20-odd years) a SOURCE clause to reduce MOVE statements.

If the SOURCE clause is a miniature movie frozen into the data division, the DESTINATION clause is really just the same movie run in reverse direction — in other words, the other side of the coin.

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Indicated overall savings. Recent questions asked of one large user of the S + PC Systems Ltd. preprocessor for combined validation and report writer facilities indicated that 500 to 600 programs had been written, about half with the validate feature alone. The user, North Thames Gas of London, claimed 20% savings in manpower.

The most significant fact was that a substantial reduction in compilations took place. Programmers were using three to four compilations for very large programs, rather than six or seven. Several regional computing centers of British Gas are well committed to using these features.

Content and Relation Validation — Cycle 2. In the second cycle, content and relation validation take place. The values placed in destination files may be used in relation checking in the second cycle. After cycles one and two are complete, error indication takes place.

Content validation. Each group or elementary data item may have any number of content-validation, level 99, entries associated with each item. During the execution of Cycle 2 of the VALIDATE statement, the contents of the associated data item are compared with the value, values or range of values in each content-validation entry.

```
[ALL] {VALID | INVALID} [CHARACTER] {VALUE IS | VALUES ARE}

{FROM {identifier-1} ...
{literal-b {THRU | THROUGH} literal-7}...}
[WHEN condition-1]
```

The simplest test is for mandatory values in a data item:

```
03 PIC X(20).
   99 VALID VALUE SPACES.
```

Any character that is not blank within this data item will cause an error, but the field is checked as a whole to determine this error. (Later, we will discuss treatment of blanks.)

An easy test with four values in a data item is as follows:

```
03 MARITAL-STATUS PIC A(8).
   99 VALID VALUES "SINGLE"
      "WIDOWED" "MARRIED"
      "DIVORCED".
```

WIDOWER causes the item to be rejected.

When the CHARACTER phrase is used, the comparison is made with each character of the associated data item.

To validate a field HEXA-

COBOL VALIDATION

IN DEPTH

NUMBER as being a hexadecimal number, character by character, use:

```
03 HEXA-NUMBER PIC XXXX.
   99 VALID CHARACTER VALUES ARE
      "0" THRU "9" "A" THRU "F".
```

Values may be specified by a literal or by an identifier which may reference a single data item or a table.

```
03 ANIMAL PIC X(20).
   99 VALID VALUES ARE FROM
      LIST-OF-ANIMALS.
...
03 LIST-OF-ANIMALS PIC X(20)
   OCCURS 100 TIMES.
```

Here is a table showing the day of the week which contains an OCCURS clause.

```
01 DAY-TABLE VALUE
   "MONTUEWEDTHUFRISATSUN".
03 DAY-MNEMONICS PIC XXX OCCURS 7.
```

This permits you to write:

```
03 IN-DAY PIC AAA.
   99 VALID VALUE FROM DAY-MNEMONICS.
```

The content-validation entry may also be qualified by a conditional expression through which the check may be activated or deactivated.

```
03 MARITAL-STATUS PIC A.
   88 MARRIED VALUE "M".
   88 SINGLE VALUE "S".
01 IN-RECORD.
   03 M-CODE PIC A.
   99 VALID VALUES "A" THRU
      "H" WHEN MARRIED.
   99 VALID VALUES "J" THRU
      "R" WHEN SINGLE.
```

The invalid condition may be specified to eliminate one or more values or a table of values.

```
03 WORKER-AGE PIC 99.
   99 INVALID VALUES
      00 THRU 15  65 THRU 99.
```

Figure 2 illustrates how content validation can be applied to check the time of day, a date, a personal name and a security code whose value must match an entry in an internal table.

Failure of content validation results in rejection of the item "on content."

An elementary item that has failed content validation cannot be further rejected on relation.

Relation Validation. Each group or elementary item may be subjected to any number of additional tests that specify its interrelationships with any other data items.

The VALID clause specifies the condition under which the data item is rendered valid or not valid, regardless of other validation checks made during the execution of a VALIDATE statement.

```
[ALL] [NOT] VALID [WHEN condition-1]
```

If a data item is in the middle of a record being validated, for example, the data item may be removed from the checks performed on other items subordinate in the record.

```
01 IN-RECORD.
   03 TIME-STAMP.
      05 HOURS PIC 99.
         99 VALID VALUES ZERO THRU 23.
      05 MINUTES PIC 99.
         99 INVALID VALUES 60 THRU 99.
   03 MONTH-DAY.
      05 MONTH-NO PIC 99.
         99 VALID VALUES 1 THRU 12.
         88 SHORT-MONTH VALUES 2 4 6 9 11.
      05 DAY-NO PIC 99.
         99 VALID VALUE 1 THRU 31.
         99 INVALID VALUE 31 WHEN SHORT-MONTH.
         99 INVALID VALUE 30 WHEN MONTH-NO = 2.
         99 INVALID VALUE 29 WHEN MONTH-NO = 2 AND LEAP = "NO".
   03 SURNAME PIC A(31).
         99 VALID CHARACTER VALUES
            "A" THRU "Z" "—" "'" ".".
   03 SECURITY-CODE PIC A(5)9.
         99 VALID VALUE FROM CODE-TABLE.
```

Figure 2. Content Validation Entries

```
05 ANYTHING-GOES PIC 999 VALID.
```

If a data item is contrary to the format shown within the same data item, that data item may be released from checks when true.

```
05 MONEY.
   07 PIC 9(4) VALID
      WHEN MONEY = "****".
```

On the other hand, if the data item is wrong when certain conditions occur and ordinarily correct:

```
05 WORK-DATE PIC 9(4) NOT VALID
   WHEN WORK-DATE = 0101 OR 1225.
```

The validity of a payment might be questioned if the payment did not measure up to a minimum payment amount:

```
03 MIN-PAYMENT PIC 9(4)V99.
03 PAYMENT PIC 9(4)V99 NOT VALID
   WHEN PAYMENT IS LESS THAN
   MIN-PAYMENT.
```

The BLANK clause specifies the condition under which the data item must be blank or not blank during

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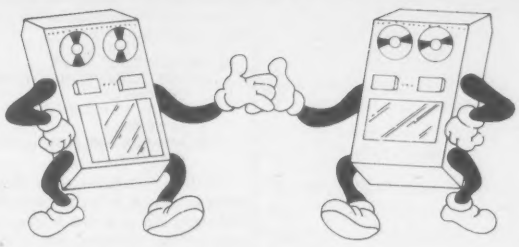

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IN DEPTH

```
01 IN-RECORD.
   03 SEX PIC X.
   03 AGE PIC 99 BLANK OPTIONAL DEFAULT 21.
   ...
   03 M-STATUS PIC X NOT BLANK.
   03 MAIDEN-NAME PIC X(32) BLANK WHEN SEX = "M" OR M-STATUS = "S."
   03 PARENTS-NAME PIC X(32) NOT BLANK WHEN AGE < 18.
   03 INITIAL-PAYMENT PIC 9(6)V99 BLANK OPTIONAL WHEN AGE < 66.
   03 PRESENT-BALANCE PIC 9(6)V99 NOT VALID WHEN PRESENT-BALANCE
      < INITIAL PAYMENT.
   03 CATEG-CODE BLANK OPTIONAL.
      05 PIC X(4) VALID WHEN CATEG-CODE = "NONE".
```

Figure 3. Relation Validation Entries

The savings in Cobol coding in the third and fourth stages, content validation and relation validation, add to the savings in the first two stages. These savings lie in reducing hundreds of lines of Cobol code to a single line.

the execution a VALIDATE statement.

```
[ALL] [NOT] BLANK [OPTIONAL] [WHEN
condition-1]
```

If an AGE is blank, it can become valid even if previously rejected.

```
03 AGE PIC 99 BLANK OPTIONAL.
```

Or if the data item is blank when it should not be, the data item can be rejected.

```
03 FORENAME PIC X(20) NOT BLANK.
```

The data item can be tied to other entries as a condition.

```
03 MAIDENNAME PIC X(20) BLANK WHEN
SINGLE OR MALE.
```

MAIDENNAME must be blank when a single female is placed on the personnel file.

If the item fails the VALID or BLANK test, it is rejected "on relation." An elementary item that has failed format or content validation cannot be further rejected on relation.

Each clause may contain a conditional expression that specifies when the check is to be applied and when it is to be ignored. Figure 3 contains several examples.

Since DESTINATION clauses are processed during the first cycle, the target fields may be referenced instead of the input item in the formulation of a conditional expression:

```
01 IN-RECORD.
   03 PIC 99 DESTINATION FIRST-WEEK
      NOT VALID WHEN FIRST-WEEK =
            LAST-WEEK.
   03 PIC 99 DESTINATION LAST-WEEK.
```

Checks at the group level that apply to the group as a whole are independent of checks on subordinate items, enabling constructions such as the following:

```
03 PAYMENTS NOT BLANK.
   05 AMT-COINS PIC 9(6)V99 BLANK
      OPTIONAL.
   05 AMT-BILLS PIC 9(8) BLANK
      OPTIONAL.
   05 AMT-CHEQUES PICK 9(6)V99 BLANK
      OPTIONAL.
```

In the example above, the group item is valid if at least one of the elementary items is not blank. At least one of the 05-level fields must be present, although individual 05-level fields may be blank. In the example below, each elementary item must pass the specified validation criteria to be valid, but if the group item is completely blank, the group item is valid.

```
03 DELIVERY-ADDRESS BLANK OPTIONAL.
   05 DELV-CODE PIC 9(6).
   05 DELV-NAME PIC X(32) NOT BLANK.
   05 DELV-LINE-1 PIC X(32) NOT
      BLANK.
   05 DELV-LINE PIC X(32) OCCURS 6.
```

More examples will not serve to explain the fundamentals. The adventurous will find that the conditions of the WHEN clause include arithmetic expressions. Maybe you would like to make up the entries for a mandatory retirement at age 60 or after 40 years of service, given date of employment and birth date?

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IN DEPTH

Cobol coding in the third and fourth stages, content validation and relation validation, add to the savings in the first two stages. The tests that are accomplished dramatically reduce the number of IF-statements applied to an input area. Many of the comparisons required would have used subscripts for each data item in examination of each character. The savings lie in reducing hundreds of lines of Cobol code to a single line.

A secondary benefit, gaining more importance in an organization, is that the validation entries are part of a data description. The preparation of these entries is, in many firms, the function of a data administrator, one who conducts a meaningful and comprehensive company survey of data and records his findings in a data dictionary.

Data should be the same everywhere in an organization, with the same data name. The validation entries do not interfere with the use of the data description for file updating, report preparation, sort, merge or any other use in Cobol.

The VALIDATE verb is more powerful than the GENERATE verb is in report writer.

One programmer, writing a report on VALIDATE for his management, stated, "Having worked (and played) with VALIDATE for some weeks now, I have found that the immensely varied combination of clauses that can be constructed provide a powerful programming tool."

He continued, "It seems natural to write validation programs in this way, and this helps [a programmer] to become competent in its use very quickly."

Error Indication in the Validation Facility.

After cycle one and cycle two are complete, error indication takes place.

During cycles 1 and 2, whenever an error is detected, a type of error condition is noted. If a data item fails in cycle 1 "on format," further validation on the item is stopped. Failure of an elementary item or content validation results in rejection of the item "on content" and rejection for other reasons is halted. Failure of relation validation in a VALID or BLANK test results in rejection of the item "on relation" and, if in error, cannot be further rejected on relation.

When all the specified checks have been completed for all the elementary and group items within the scope of the VALIDATE statement, the outcome of the validation may be reported. This is accomplished by means of the ERROR STATUS clause.

The general format for the clause is as follows:

```
ERROR STATUS IS { literal-1   }
                { identifier-1 }

[NO ERROR STATUS IS { literal-2   }
                    { identifier-2 }

[ON { CONTENT  } FOR {identifier-3}...
   { FORMAT   }
   { RELATION }
```

The clause enables a specified value to be placed in locations elsewhere in the data division if a certain item, or a set of items, fails a particular check.

In its simplest form, the ERROR STATUS may be used to produce an error message for one particular field.

```
01 IN-RECORD
   03 IN-DATE PIC 9(6).

...

01 ERR-IN-DATE PIC X(12)
   ERROR "INVALID DATE" FOR
   IN-DATE.
```

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IN DEPTH

History of the Validation Facility

The validation facility originated as a proposal for format validation written by Ken Meyer in November 1974 and presented to a working committee of the British Computer Society Cobol Specialist Group set up by Tony Sale. Meyer developed it into a proposal to the Programming Language Committee in mid-1975 with John Triance, John Piggott and others. Piggott continued to enhance the syntax, semantics and operation. In 1978, arrangements were made with North Thames Gas for ICL 1900 development, with West Midlands Gas for ICL 2900 development and with Southeastern Gas for large IBM mainframe development.

Proposals were made in 1980 from a group led by Phil Brown, Burroughs Corp. and now National Computing Centre representative to the Codasyl Cobol Committee. Rod Grealish has served on the committee, which worked on the proposals that resulted in acceptance of the validation facility into the Codasyl Cobol Committee *Journal of Development* in July 1982.

John Piggott formed S + PC Systems Ltd., 69 Merton Hall Road, Wimbledon, London, England SW19 3PX to develop and market preprocessors that have enhanced Ansi Cobol compilers for ICL, IBM and Sperry Corp. mainframes.

```
Record Under Validation;
 01 IN-RECORD.
    03 CODE-1 PIC AAA99X.
    03 VALUE-GRP.
       05 VALUE-1 PIC 9(6).
       05 VALUE-2 PIC 9(6) NOT VALID WHEN VALUE-1 = < VALUE-2.
          99 INVALID VALUES 0 THRU 100000.
    03 CODE-2 PIC 999B99B999 OCCURS 2.
Error Status Reports;
 01 GLOBAL-MESSAGE PIC X(15)
    ERROR STATUS "INVALID RECORD"
    NO ERROR STATUS "RECORD ACCEPTED" FOR IN-RECORD.
 01 DETAILED-MESSAGES.
    03 MSG-1 PIC X(12)
       ERROR "INVALID CODE" FOR CODE-1 CODE-2(1) CODE-2(2).
    03 MSG-2 PIC X(17) ERROR "VALUE NOT NUMERIC" ON FORMAT FOR
       VALUE-GRP.
    03 MSG-3 PIC X(30) ERROR "VALUE-2 OUT OF RANGE" ON CONTENT
       FOR VALUE-2 ERROR "VALUE-1 SHOULD EXCEED VALUE-2" ON
       RELATION FOR VALUE-2.
    03 FLAG-1 PIC 9 ERROR 9 FOR IN-RECORD.
    03 FLAG-2 PIC 99 OCCURS 2 ERROR 23 FOR CODE-2.
```

Figure 4. Example of ERROR STATUS reporting.

The ERROR STATUS is as flexible in its messages as could be required, as show here:

```
03 ERROR "NOT 'M' OR 'F' " FOR SEX.
03 ERROR "NOT NUMERIC" ON FORMAT
   FOR AGE.
03 ERROR  "DATA NOT ACCEPTED"
          NO ERROR "DATA ACCEPTED"
          FOR NEW-CUSTOMER.
```

The status of a group item may be indicated as well as that of elementary items. Unless overridden by clauses associated with a group item, it is invalid if any immediately subordinate item is invalid.

```
01 IN-RECORD.
   03 IP-DATE BLANK OPTIONAL.
      05 IP-MO PIC 99.
      05 IP-DAY PIC 99.
...
      05 IP-YR PIC 99.
01 DATE-ERR PIC X(12)
   ERROR "MONTH ERROR" FOR IP-MO
   ERROR "DAY ERROR" FOR IP-DAY
   ERROR "YEAR ERROR" FOR IP-YR.
```

Several messages can be written in the same area for elementary items in the same group, in which case the priority is from the order in which they are written in the data description. A good systems designer would allow one message per line (but space may be limited). On a terminal, for example, space may be limited, so only one response may be shown at a time.

Dispersal. Error messages can be dispatched to any data division section at any level and combined with other clauses. For batch programs, it may be convenient to place the messages in the WORKING-STORAGE SECTION or REPORT SECTION. A WRITE or GENERATE would be required.

For on-line use, it may be more convenient to use the WORKING-STORAGE SECTION or LINKAGE SECTION. This requires a DISPLAY or SEND statement or an exit to the teleprocessing monitor.

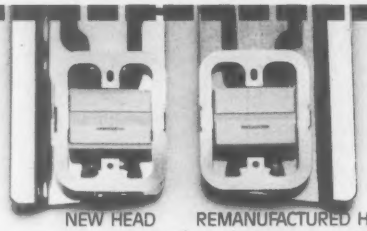
Format. The ERROR STATUS is not limited to messages and can use numeric or alphabetic literals of any type. Error numbers for some systems have become ingrained in the error-handling procedures. One way of handling the IP-DATE example is shown:

```
01 ERROR-AREA.
03 ERR-1 PIC Z9 ERROR 1 FOR
   IP-DATE.
03 ERR-2 PIC Z9 ERROR 2 FOR
   IP-MO.
03 ERR-3 PIC Z9 ERROR 3 FOR
   IP-DAY.
03 ERR-4 PIC Z9 ERROR 4 FOR
   IP-YR.
```

This would give an erroneous date of 999999 an error message: 1234.

The combinations are not limited in their scope.

Valid Status. Valid status is



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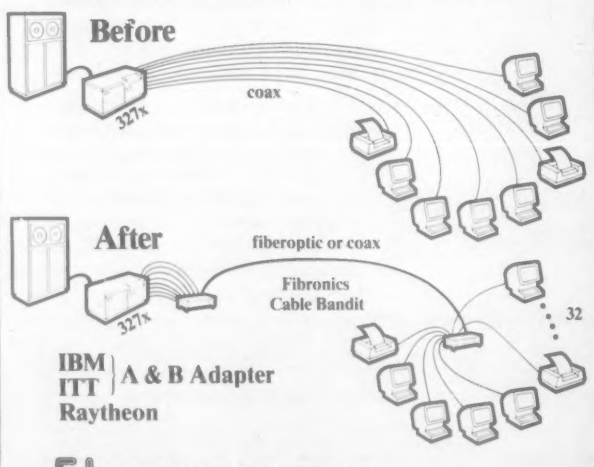

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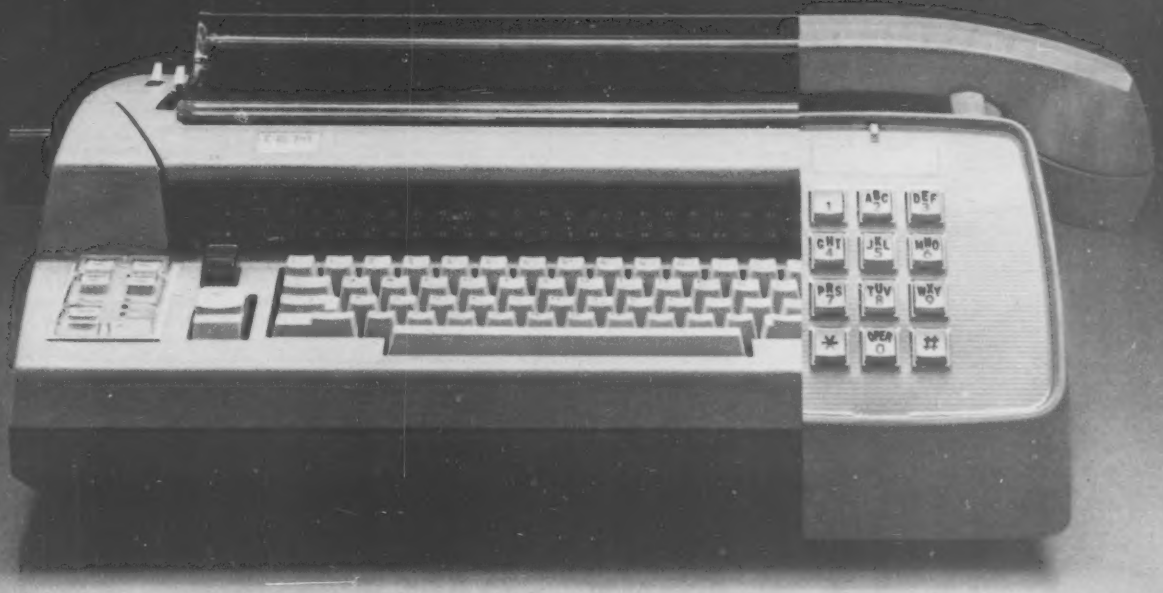

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indicated by a default value, which is zero or spaces unless specified. This is overridden with any message specified with the value shown with the NO ERROR phrase.

Three stages of validation, format, content and relation may also be distinguished by means of the ON phrase in the ERROR STATUS clause. Figure 4 (on In Depth/30) shows most of the variations possible with the ERROR STATUS clause.

The ERROR STATUS clause has no effect on the program or the contents of the working-storage, linkage or report sections, as indicated, until a VALIDATE statement has been executed. A few of the methods in common use for error reporting have been shown. As discussed, the preparation of error messages can be done automatically through use of this clause and in conjunction with VALIDATE.

Overall savings. One installation showed that with the validate feature replacing a major 6,000-line validation program, by comparison, structure took 20%, coding took 57% and testing took 42% of the time. The compilation time was similar, but 350 statements generated 1,750 statements, replacing 3,400 hand-coded statements in the program.

P.A. Graham points out that "The objective of the Cobol validate feature is to provide automatic validation and error-reporting procedures driven by the data description of the item to be validated."

"Validation programs tend to be tedious, repetitive and boring — to the extent that very often they are merely a sequence of simple tests. This tends to mask the basic logic of the program, and the nature of the input data becomes lost in a mass of conditional statements.

"Relative to other programming areas, costs for both development and maintenance of validation programs should see a reduction as programmer time becomes more expensive and computer equipment becomes cheaper."

Since the Ansi X3J4 Committee rejected this validation facility in the 198X standard, it looks like Cobol users will have to wait until the turn of the decade to share these gains on each and every Cobol machine. Jerry Garfunkel of Jerome Garfunkel Associates in Litchfield, Conn., has come up with a proposal for Cobol enhancement at mid-stream. X3J4 has already accepted this method for network data bases, pending the completion of the Codasyl X3H2 Committee report.

One installation showed that with the validate feature replacing a major 6,000-line validation program, by comparison, structure took 20%, coding took 57% and testing took 42% of the time.

It is fine to represent Cobol as a consistent language with compatibility and continuity between versions, but this principle should not cut off development of new features that will improve the language for users and management. This validation facility should mean cash savings and orderly, progressive development of Cobol.

Comments on the validation facility can be addressed to Linda Willis, chairwoman, X3J4 Cobol Technical Committee, Cbema, Suite 500, 311 First St. N.W., Washington, D.C. 20001.

About the Authors

Ken Meyer has been active in data processing since 1955 with Pure Oil (now Union Oil), Creole Petroleum (Esso) in Venezuela, Control Data Corp. and British Gas. He now consults, writes and lectures in the UK. He also serves on the ISO Cobol Experts' Group and belongs to the Association for Computing Machinery and British Computer Society (BCS).

Rod Grealish worked with ICL from 1971 through 1974 and, since then, has been lecturing at Coventry (Lanchester) Polytechnic in programming languages and data bases. He is a member of the British Standards Institute Cobol Group, the National Computing Centre Cobol Group and the BCS.

John Piggott has spent his entire computing career as a consultant. His interest lies in merging the linguistic and logical aspects of programming. He is currently managing director of S + PC Systems Ltd. in London and is working in the area of data languages derived from Cobol.

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SNF runs under IBM's OS or DOS operating systems using CICS and supports a full transaction set along with administrative and communication messages, according to the spokesman.

The product is priced at $35,000 from the vendor through P.O. Box 668, Fuquay Varina, N.C. 27526.

Electronic Funds Transfer, Not ATMs, Seen Bank Rage

By David Myers
CW New York Bureau

NEW YORK — The real breakthrough in electronic banking is not — as many believe — the automated teller machine; it is next-day electronic funds transferal, George C. White Jr. told an audience at the Association of Computing Machinery Conference here recently.

White, a former executive with Chase Manhattan Bank and now president of his own consulting firm, told listeners about a pilot installation at Exxon Corp. gas stations in Southern California, where customers authorize an electronic withdrawal on their checking accounts to pay for their fill up.

Funds are transferred the next business day, saving Exxon money on the transaction, a portion of which the oil company passes on as a 4 cent bonus to customers using the plan.

"You keep reading articles that say the consumer must be educated. That's a bunch of nonsense. The consumer is already educated," White said.

'You keep reading articles that say the consumer must be educated. That's a bunch of nonsense. The consumer is already educated. . . . Those who must be educated are the banks' corporate customers.' — George C. White Jr., former Chase Manhattan Bank executive.

Those who must be educated are the banks' corporate customers, White declared. Less than 20 large U.S. corporations are receiving payments electronically, he said.

While banks may protest that they are already selling electronic funds transfer (EFT) to their corporate customers, only 8% of American banks are using EFT for their own payments.

Instead, banks are busy setting up electronic bank-at-home systems that permit customers to authorize a withdrawal of funds via their home computers. "In plain fact, that's even slower than the old method because the bank still has to make out a paper check to send to the payee. Consumers are too well educated to accept something as dumb as this," White said.

At this point, only 1% of the checks drawn on U.S. banks are paid out through EFT, according to White.

What may be slowing the acceptance of EFT is the proliferation of automated teller machines, White suggested. Automated same-day transactions are properly used when there is a pressing need for immediate payment, since they are vastly more expensive than a next-day electronic transfer of funds, White pointed out.

But same-day transactions are all the rage. "We assume it should be done because we have the capability to do it," he said.

EFT will win acceptance from corporate customers only when they understand that the leading argument for EFT is not its immediacy. "All the electronic transfers in the world don't get you your funds any faster," White said.

But a setup that permits transactions to occur electronically "from initiation to completion — that's when you have a real electronic transfer that is worth using," White said.

'Intext II Emulator' Boasts IBM Micro Emulation With Unix

SANTA MONICA, Calif. — Interactive Systems Corp. has announced the Intext II Emulator, a software package said to allow the IBM Personal Computer to act as an intelligent terminal compatible with the company's versions of Bell Laboratories' Unix operating system.

The product runs under IBM's PC-DOS operating system on any IBM Personal Computer or Personal Computer XT with at least 64K bytes of memory, one diskette drive, a color and/or black-and-white monitor and an asynchronous communications card.

The emulator allows the IBM Personal Computer to function as Digital Equipment Corp.'s VT100 or VT52 terminals and also as a standard dumb terminal to access asynchronous communications ports on the majority of machines and most public communications networks, the vendor said.

The unit is priced at $475.

Further information on the emulator is available from Interactive Systems, 1212 Seventh St., Santa Monica, Calif. 90401.

Protocol Controller Features Ascii Link

TORRANCE, Calif. — Local Data Co. has announced the Interlynx/3278 protocol controller that enables asynchronous Ascii devices to be linked to IBM control units via coaxial cable.

The protocol converter performs the multiple interface and protocol conversion functions necessary for plugging asynchronous mini and microcomputers, CRT word processors, port selectors, modems and terminals into the IBM Type A coaxial port. The price is $1,395.

Local Data is located at Suite 706, 2701 Toledo St., Torrance, Calif. 90503.

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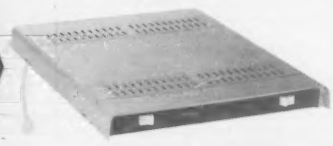

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Includes Fame II, III, 100

Fame Series of Terminal Products Announced

SUNNYVALE, Calif. — Falco Data Products, Inc. has announced the Fame series of terminal products including Fame II, Fame III and Fame 100.

The Fame II features 22 user-programmable function keys with room in nonvolatile memory for up to 900 characters. An optional keyboard provides 48 functions. The additional preprogrammed function keys offer editing capabilities, screen-display control and data transmissions from either of two independently configurable ports, a vendor spokesman said.

The display screen features 24-line by 80-col. screen size with a 25th line for status information, the vendor said.

The Fame III is a general-purpose Ascii terminal with a 24-line by 80-col. display. The unit has a microprocessor-controlled logic board and a CRT control circuit for a separate sync/video CRT monitor. This model offers a standard Falco keyboard with 101 keys and features a 128-char. generator, with 96 Ascii displayable characters and 32 special symbols, the vendor said.

The Fame 100 features 18 user-programmable, nonvolatile function keys, advanced video option (132 col. by 24 lines, graphics character), conversation and block modes with VT-131 edit commands, local printer port, display of control characters and a pass-through print capability. Pricing for the series ranges between $595 and $1,195.

Further information is available from Falco Data Products, 1286 Lawrence Station Road, Sunnyvale, Calif. 94089.

Racal-Milgo Unveils Central-Site Modem

MIAMI — Racal-Milgo, Inc. has introduced the Omnimode central-site modem, said to permit users to operate up to 64 central-site modems having data rates of 4,800 and/or 9,600 bit/sec from a single master front panel.

The central-site modem is available as a primary or secondary shelf. The primary shelf provides a master front panel for controlling the central-site modems. Each shelf has a dedicated power transformer, a vendor spokesman said.

The product allows the operator to monitor, test and control all modem operating parameters for the entire modem rack. Shelf/unit indicators and controls enable location of individual modems for immediate operator action and response, the vendor said.

Pricing begins at $2,600 for the primary shelf and $1,600 for the secondary shelf, from Racal-Milgo, 8600 N.W. 41st St., Miami, Fla. 33166.

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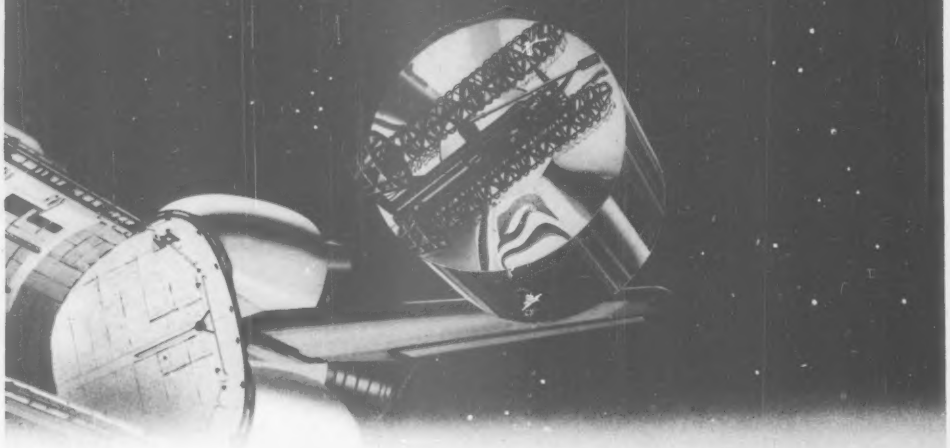

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Access 1-2-3 Unwrapped For IBM Micro

CHATSWORTH, Calif. — Novation, Inc. and Microstuf, Inc. have announced the Access 1-2-3, an IBM Personal Computer communications system, which combines Novation's PC1200B modem and Microstuf's Crosstalk XVI software.

The modem features a set of commands and responses that provides telephone-line status. It has a built-in dialer with dial tone and busy-detect, which allows the modem to be programmed to redial. Autoanswer is also included, and the product can provide audio monitoring through the computer's internal speaker, the vendor said.

The PC1200B is capable of operating at either 300 or 1,200 bit/sec full duplex, and can perform an automatic self-test and receiver alignment at power-on and can be put into analog or digital loop-back test modes.

Crosstalk XVI is an intelligent terminal and file transfer program that allows for disk-to-disk transfer and provides control of stop bits, parity, bit/sec rate and duplex while on-line. The package is available for $595.

Further information is available from Novation, 20409 Prairie St., Chatsworth, Calif. 91311.

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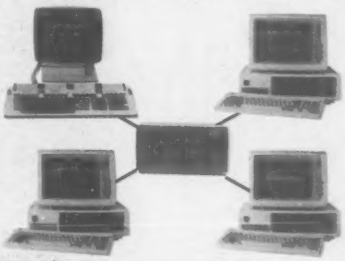

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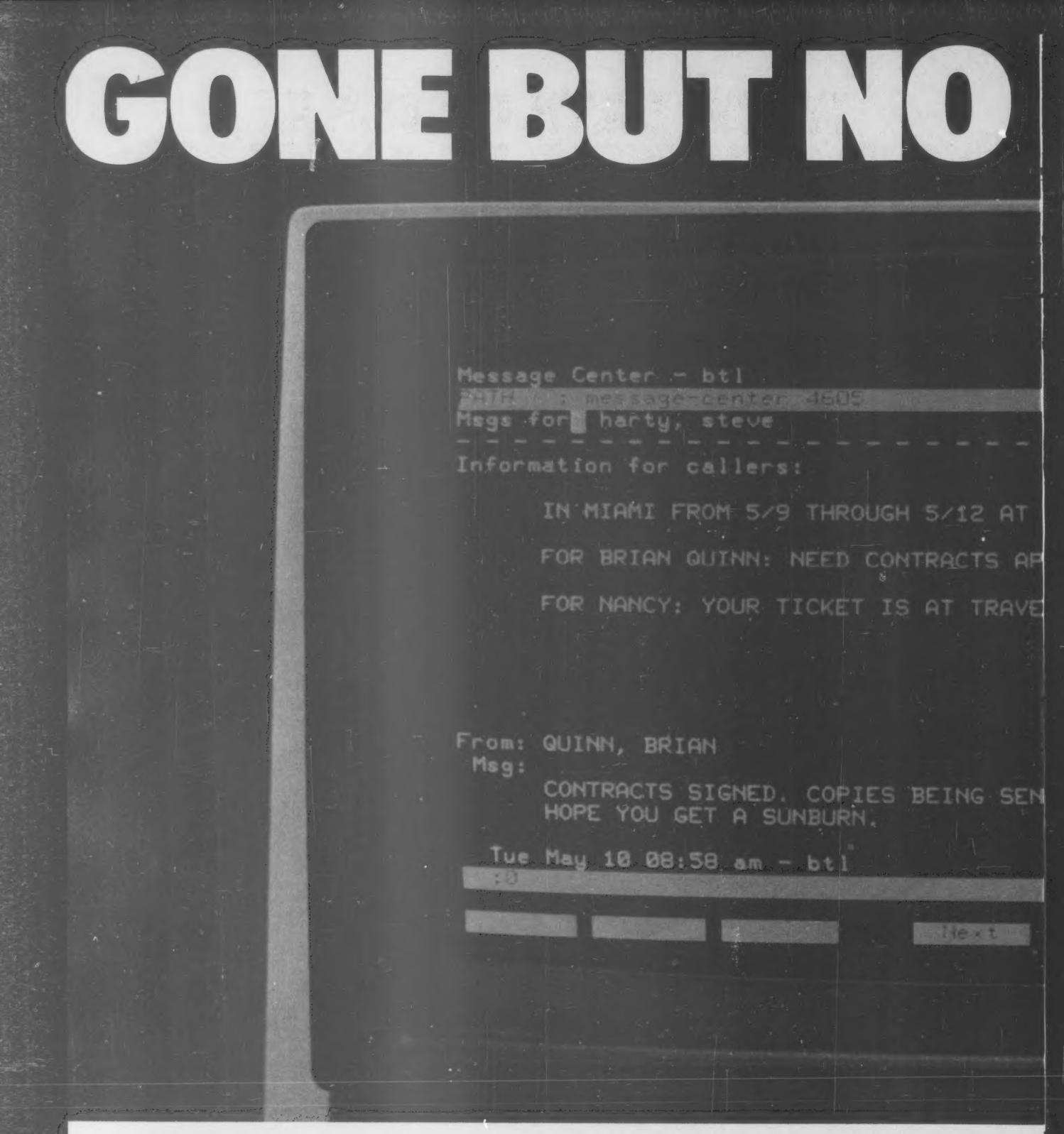

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The Directory function adds to Message Center. It's an on-line database that gives you continuously updated information about fellow employees. Information such as name, extension number, location, title, department, and up to ten other fields of information.

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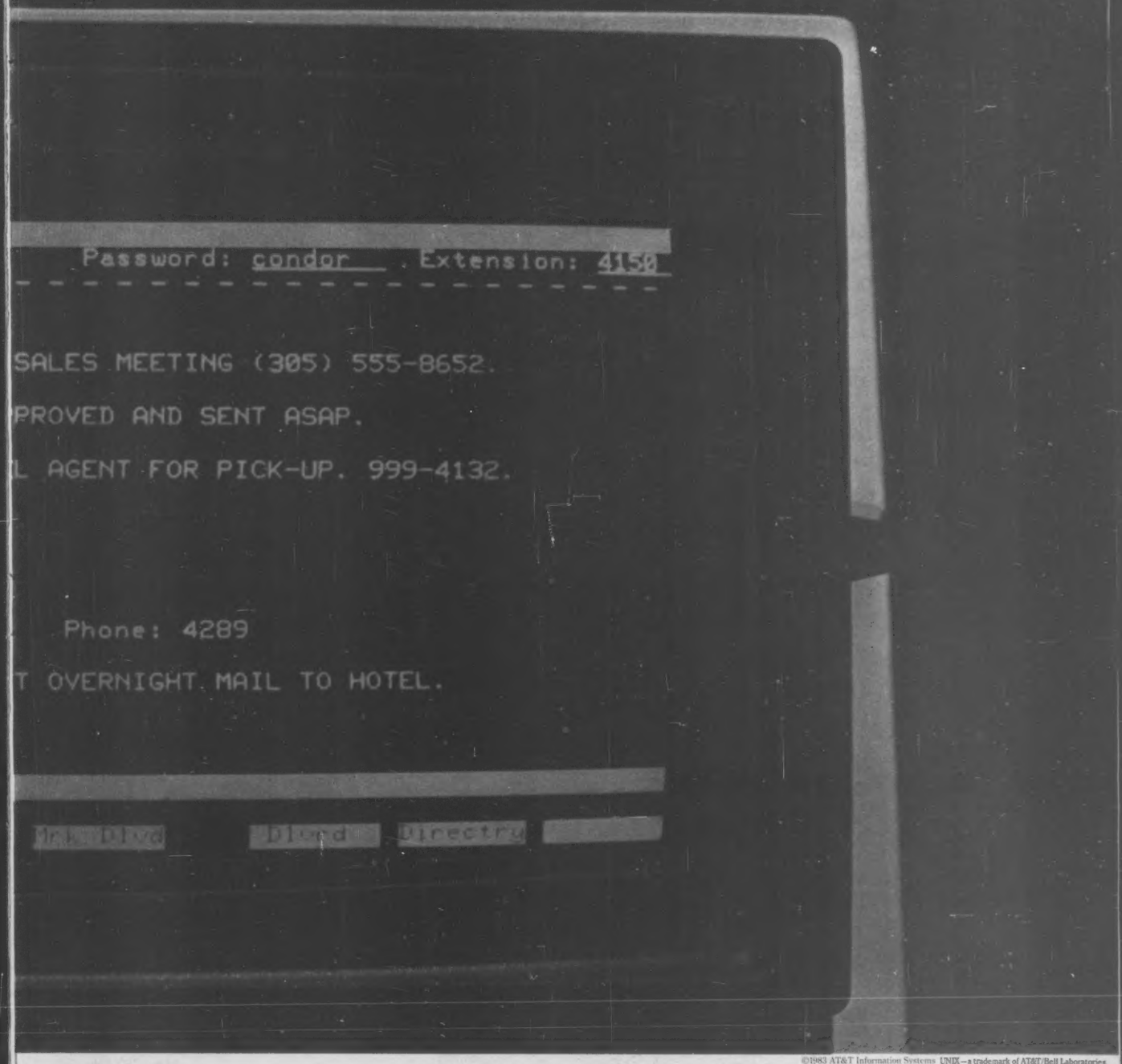

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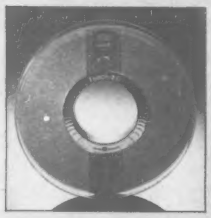

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GX-100 Graphics Terminal Announced by Modgraph

WALTHAM, Mass. — Modgraph, Inc. has introduced the GX-100 graphics terminal and workstation.

The workstation includes dual 5¼-in. floppy disk drives and a digitizing tablet.

Some features include 768 by 585 pixel resolution on a 15-in. CRT, dual graphics and text screens and emulations of Digital Equipment Corp.'s VT100/VT52, Lear Siegler, Inc.'s ADM-3A and Tektronix, Inc.'s 4010/4014 terminals.

In the workstation mode, the floppy drives allow the user to run under Digital Research, Inc.'s CP/M 2.2 operating system.

The graphics terminal is priced at $2,550.

Further information is available from Modgraph, 1393 Main St., Waltham, Mass. 02154.

RJE Protocol Introduced For 68000 Line

IRVINE, Calif. — Alpha Micro, Inc. has announced the availability of its RJE communications protocol for its line of Motorola, Inc. 68000-based systems.

The product will allow users with properly configured systems to communicate with most other manufacturers' computers that use IBM's Binary Synchronous Communications protocols 780 and 3780, as well as with other Alpha Micro systems.

By enabling a user's Alpha Micro system to communicate with other Alpha Micro systems, the RJE protocol allows data to be transmitted over dedicated or leased telephone lines instead of requiring the user to transport manually floppy diskettes or other media, the vendor said. The price ranges from $300 to $450.

Further information is available from Alpha Micro, 17332 Von Karman Ave., Irvine, Calif. 92714.

TRS-80 Model 4 Gets Adapter For Mainframe

NEW BRUNSWICK, N.J. — Microframe, Inc. has introduced a mainframe communications adapter for the Radio Shack TRS-80 Model 4.

The Bisync 4 allows the microcomputer to emulate a cluster controller with a single terminal attached. It also provides IBM 3287 printer emulation on the Model 4's printer.

According to the vendor, any number of Model 4s can share a single line without a cluster controller. A simplified line-sharing system, integrated into every Bisync 4 unit, reportedly ensures fair access to the line by each unit.

The Bisync 4 software provides features such as full screen editing, screen printing and screen-to-disk copying. Also available is 2780/3780 protocol support. Priced at $700, Bisync 4 comes with a 30-day, money-back guarantee.

More information is available from Microframe at 205 Livingston Ave., New Brunswick, N.J. 08901.

Emulator Allows IBM Micros To Access Hosts

IRVINE, Calif. — AST Research, Inc. has announced the Pcox terminal emulator, which allows IBM Personal Computer and Personal Computer XT systems to access IBM host systems as an IBM 3274, 3276, 3278 or 3279 terminal.

Among the terminals the Pcox emulator replaces are the IBM 3278 Model 2, 3 or 4; the IBM 3279 Model 2A or 3A; and the IBM 3274 and 3276. The emulator also provides direct communications for 3270 series users with coaxial connections, the vendor said.

To access the IBM mainframe in a real-time mode, the user activates the communication link and keys in mainframe commands on the micro, a vendor spokesman said.

The package costs $1,195. An optional file transfer program Pcox-ETU, which provides menu-driven file transfer from the Personal Computer XT to the host and from the host to the Personal Computer XT, costs $200.

Further information is available from AST Research, which is located at 2372 Morse Ave., Irvine, Calif. 92714.

Firm Unveils Portable Tester

WESTBORO, Mass. — Muir Test Systems, Inc. has introduced a portable interactive terminal tester.

The Model CT-300 permits full, off-line testing and exercise of intelligent and dumb terminals; serial, line and page printers; graphics printers and plotters; graphics displays and models, all without need for an external CPU.

The CT-300 weighs 8 lb and is suited for field service, depot or factory use. It operates on RS-232C, RS-422, RS-423, current loop, MIL-188C and parallel ports, a vendor spokesman said.

User-generated tests are programmed through the front panel keypad and can be stored within a battery-backed random-access memory cartridge that is provided within the CT-300 operating system, permitting development of a very wide range of test programs by the user.

Test control can be via the CT-300 keypad itself (controller-made) or can be transferred to the keyboard of the device under test (interactive mode).

In many interactive operations, bit/sec rate, parity, error bits and data bits are automatically set and can be read.

A single unit is priced at $2,795.

Muir Test Systems is located at 129 Flanders Road, Westboro, Mass. 01581.

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PACKMAN is a disk management tool that deals with two areas normally addressed separately: space utilization and usage contention under VM. A map of free and used space combines the CMS users mini-disk utilization and guest SCP data set usage. The online display of head contention also shows position by data set name.

ICCFCNVT converts DOS/VSE ICCF library members to VM/CMS format files. It converts all, or selected members from ICCF libraries. An equivalent of the ICCF /INCLUDE function is provided. A cross reference of all member inclusions is optional.

MAPMAN utilizes DMS for CMS to expedite CICS screen design by allowing the programmer to define and format screens interactively. It then creates both the BMS macros and symbolic description maps for inclusion in the CICS source transaction. MAPMAN will also convert previously defined BMS macros to DMS/CMS format for future simplified maintenance.

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Uses IBM's BSC Protocol

Firm Unveils Conversion Device

MIAMI, Fla. — Innovative Electronics, Inc. has announced the MC-80/602 communications processor, a device that converts a general keyboard send/receive device or an asynchronous Ascii host into a full-function IBM 3277 Model 1, 2 or 3278 Model 2 terminal communicating with the IBM host using IBM's Binary Synchronous Communications protocol.

Full screen mapping is performed by the MC-80/602. Data displayed on the terminal will be the same as an IBM 3277/3278 display station, with virtual screen sizes of 480, 960 and 1,920 characters, the vendor said.

This stand-alone, self-powered communications processor provides up to 16K bytes of read-only memory, 16K bytes of random-access memory and one serial communications port. The price is $1,650.

Further information is available from Innovative Electronics, 4717 N.W. 165th St., Miami, Fla. 33014.

Micros Get Full-Page Terminals

HASTINGS, Minn. — Micro Display Systems, Inc. has announced two full-page display terminals for use with microcomputer systems.

Both terminals feature 57 lines by 80 char., high resolution, reverse video, flashing attributes, phosphor choices of black and white, green or amber, multiple protocol and a low profile keyboard, a vendor spokesman said.

The Model 202 is a full-page Ascii terminal with a personal computer-style keyboard that has 20 user-definable keys, while the Model 212 provides Digital Equipment Corp. VT100 terminal emulation.

Priced at $1,995, the terminals are available for immediate delivery from Micro Display Systems, 1310 Vermillion St., P.O. Box 455, Hastings, Minn. 55033.

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Emulator Targets Zenith Z100 At VT52, VT100

VANCOUVER, B.C. — KEA Systems Ltd. has released Zstem, a smart-terminal emulator for the Zenith Data Systems Corp. Z100 microcomputer system.

Zstem emulates a VT52 or VT100 terminal and provides parallel and serial printer support, as well as bi-directional file transfer capability. Zstem can be configured by the user to operate from 38.4K to 45.5K bit/sec, half or full duplex.

The user can also control the number of data/parity/stop bits, flow-control protocols and programmable soft keys (any key can represent any string of characters). Configurations may be saved temporarily or permanently, KEA Systems said.

The emulator is priced at $98.95 for VT52 emulation and $148.95 for VT100 emulation, according to the vendor.

More information is available from KEA Systems, Department ZCW-1, 311-811 Beach Ave., Vancouver, B.C., Canada, V6Z 2B5.

'Passport' Gets Enhancements From Datalex

SAN FRANCISCO — The Datalex Co. has announced an enhanced version of Passport, a remote communications program said to provide full-protocol file and program transfer from microcomputer to microcomputer and between micros and remote computers.

Some product features include full file transfer capability with error checking, utilization of a protocol data transfer link to the remote computer to ensure accuracy of file transfers, data transfer protection with check-sum/retransmit and by a sequence check on each packet and the transfer of both Ascii and binary files, the vendor said.

Passport operates on IBM and IBM compatibles under Microsoft Corp. MS-DOS, PC-DOS and the UCSD P-system. An asynchronous modem is required to transfer data over regular phone lines. The price is $260 each.

Further information is available from Datalex located at Suite 406, 650 Fifth St., San Francisco, Calif. 94107.

'If the Computer Said You're Due for a Raise, Let It Give It to You.'

STC Laser Printer Targets IBM Users

LOUISVILLE, Colo. — Storage Technology Corp. (STC) has unveiled the 6100 printing subsystem, a nonimpact laser printer aimed principally at users of IBM and compatible mainframes.

The 6100 uses laser technology and electrophotography. The unit is capable of printing forms, data and text at up to 103 page/min using an 8½-in. page format. The printer attaches to IBM processors via the interface used by IBM's laser printer, the 3800, STC said.

The 6100 employs a constant paper-feed rate and is not affected by line length, the number of lines or the density of lines or characters. In addition, STC contends the 6100 offers a higher print quality than high-speed impact printers.

An integrated controller allows internal modules of the 6100 to intercommunicate. In addition, a page buffer is included to hold one or more pages of information. This, STC said, allows incoming data to be printed continuously.

The 6100 printer is capable of handling single-part forms from 6½- to 16 in. wide and from 8- to 14 in. long.

The 6100 costs $195,000. The unit can be leased for $5,659/mo on a three-year plan, which includes maintenance, STC said from 2270 S. 88th St., Louisville, Colo. 80028.

Sperry's 1900/20 Out, 1900/10 Systems Get Multiprocessor Versions

BLUE BELL, Pa. — Sperry Corp. has announced a distributed processing-and-capture system, the 1900/20. At the same time, the firm announced multiprocessor configurations of its existing 1900/10 processor.

The 1900/20 offers basically the same specifications as the firm's earlier 1900/10 processor; however, it incorporates an enhanced CPU board, which includes features aimed at accessing mainframe data easier, the vendor said.

The 1900/20 reportedly features 512K bytes of main memory, 4M to 120M bytes of Winchester storage and a maximum disk capacity of 480M bytes.

Added features include an Ansi 74 Cobol compiler and a multiport communications capability. The 1900/20 can use the same 17.6M-byte fixed disk drives, 30M-byte Winchester disk drives, key stations and card readers as the earlier 1900/10. In addition, the 1900/20 operating system, 80 R1, is functionally similar to the operating environment used in the 1900/10, a Sperry spokesman said.

Ansi Cobol, based on the Ansi X3.23 1974 Cobol standard, can be implemented in less time than the earlier checkbox Cobol complier. In addition, Sperry said that 1900/20 users can take advantage of many third-party software programs by using the Ansi Cobol compiler.

Cobol jobs now running on users' mainframes can be offloaded to the 1900/20 without modification.

Existing 1900/10 systems can be converted in the field to 1900/20 systems. A typical 1900/20 system, which consists of a processor with 128K bytes of main memory, five CRT terminals, a 10½-in., 600 bit/in. tape drive and 30M-byte disk drive, costs $80,060 and is available on a five-year lease program for $2,261/mo, Sperry said.

In addition to the 1900/20, Sperry announced multiprocessor versions of its 1900/10 system. Called the 1900/32 and 1900/33, the units offer two- and three-processor configurations of the 1900/10, respectively. The 1900/32 costs $47,004, or $869/mo, on a five-year plan. To field-upgrade a 1900/10 system to the 1900/32 costs $15,600. The 1900/33 costs $58,204, or $1,082/mo, on a five-year plan. To upgrade to the 1900/33 from the 1900/32 costs $11,200, according to the vendor, which can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

Sun Unveils 32-Bit Workstation

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. has announced two 32-bit, engineering-oriented workstation/processors based on the Motorola Corp. 68000 microprocessor. The units operate under the firm's version of the Unix operating system.

Called the Sun-2 family, the units consist of deskside and rack-mountable workstations that offer dedicated computing power plus the ability to use the units in a local-area network, such as Xerox Corp.'s Ethernet.

Aimed at software development, document preparation and computer-aided design and manufacturing applications, the workstations, called Sunstations, feature local-area network communications as a standard capability.

Local-network hardware and software permit several types of resource sharing among clusters of Sunstations, such as common printer service and common modems for remote telecommunications.

The Sun-2/120 can be configured either as a network node or a self-contained, standalone system. The Sun-2/170 is a rack-mountable system intended to act as a file server equipped with a disk drive, tape drive or other peripherals, according to the vendor.

Both models use an Intel Corp. Multibus backplane, with nine slots in the Sun-2/120 and 15 slots in the Sun-2/170. A standard Sun-2/120 workstation, including a processor, 1M byte of main memory, a bit-mapped graphics display, keyboard, mouse, Ethernet interface and all software, costs $16,900. A stand-alone configuration substituting a 42M-byte formatted disk drive and a ¼-in. tape unit for the Ethernet interface costs $16,300, the vendor said.

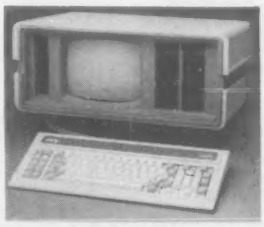
A standard Sun-2/170 workstation, including the processor, 2M bytes of main memory, Ethernet interface and software, costs $20,900, Sun Microsystems said from 2550 Garcia Ave., Mountain View, Calif. 94043.

IVY Portable Micros IBM Micro-Compatible

WILMINGTON, Mass. — IVY Microcomputer Corp. has announced the IVY 3000 series, two portable microcomputers that are reportedly fully compatible with IBM Personal Computer software. Both systems are based on the Intel Corp. 81086 microprocessor.

The IVY 3001 offers two half-height 5¼-in. diskette drives and 256K bytes of random-access memory (RAM). The IVY 3002 offers one half-height 5½-in. diskette drive, one 10M-byte, half-height, 5¼-in. Winchester disk drive and 256K bytes of RAM. Memory is expandable to 512K bytes on both units, the vendor said.

The IVY 3001 costs $2,995, and the IVY 3002 costs $3,995, IVY Microcomputer said from 220 Ballardvale St., Wilmington, Mass. 01887.



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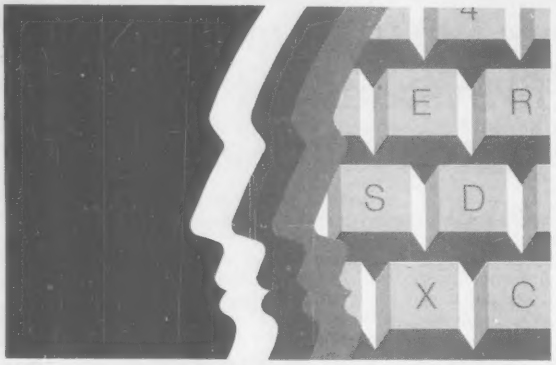

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Inforex Data Entry System Supports Up to 24 Terminals

BURLINGTON, Mass. — Inforex, Inc. has announced Gen-V, a 32-bit data entry system that supports up to 24 terminals.

The unit is equipped with 512K bytes of standard memory, which is expandable to 2M bytes. The Gen-V can support from 10M to 120M bytes of Winchester disk storage, the vendor said.

Besides supporting up to 24 terminals, Gen-V can perform concurrent foreground and background tasks. Multifunctional terminals can be used for data entry, data management, report generation or application programming. A remote terminal capability allows remote terminals to share the same data base and programs as local terminals. Remote terminals can be operated on-line at up to 19.2K bit/sec through standard RS-232C protocols, the vendor said.

Software for the Gen-V was designed to provide integrated data entry, file management, report writing and multiple communications protocols. The software is menu driven and provides extensive on-screen Help messages. For the experienced user, menus can be bypassed with direct-access commands. The Gen-V supports both Ansi 74 Cobol and Basic. An English-like data entry language is also provided, the vendor said.

Data can be entered in either a batch or interactive mode using a check-box selection format, according to Inforex.

A typical Gen-V configuration consisting of the processor, 512K bytes of memory, a 10M-byte hard disk drive, a 1M-byte floppy disk drive and 10 terminals costs $35,000.

Inforex, a subsidiary of Datapoint Corp., is located at 186 Middlesex Tnpk., Burlington, Mass. 01803.

Mid-Size System Gets Backup From HP Drive

PALO ALTO, Calif. — A dual-density, start/stop and streaming-mode tape drive from Hewlett-Packard Co. is designed for the backup of mid-range systems with 100M to 500M bytes of on-line disk storage.

The HP 7974A is a ½-in. phase-encoded tape drive formatted with 1,600 char./in. An 800 char./in. non-return to zero inverted (NRZI) dual-density option is also available.

Using tension-arm buffering, the drive offers start/stop tape motion operating at 50 in./sec and rewinds at 200 in./sec. In streaming mode, it operates at 100 in./sec.

Other features of the HP 7974A include burst transfer rate of 160K byte/sec, start/stop time of 7.6 msec and access time of 59 msec.

The tape system costs $12,500, and the 800 NRZI format option is priced at $2,500. Further information is available from HP at 1820 Embarcadero Road, Palo Alto, Calif. 94303.

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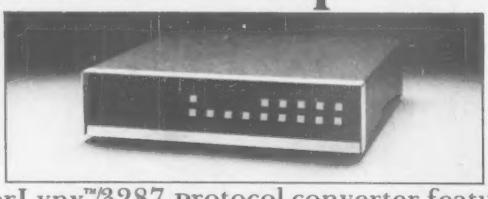

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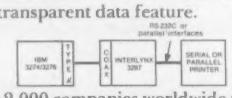

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Plessy Offers Two Systems Capable of DEC Emulation

IRVINE, Calif. — Plessey Peripheral Systems has introduced two Digital Equipment Corp. 11/23-based computer systems which feature a controller that addresses large-capacity disk drives and allows for the addition of a wide variety of storage module type devices, according to a spokesman for Plessey.

The new Models 6603 and 6703 include a Plessey-designed controller board that provides emulation of DEC's RMO2/RMO5 disk drives, the spokesman said.

Both systems are said to feature an 8-in., 67.3M-byte formatted capacity disk drive with 28.3 msec data access time.

Six communication ports are also standard, according to the spokesman.

The Model 6603 reportedly has 256K bytes of on-board memory; the Model 6703 has 512K bytes expandable to 4M bytes.

Applications for the system include those in memory-intensive markets such as data base management applications.

The Model 6603 is reportedly priced at $17,750, and the Model 6703 is priced at $19,750, in single quantities.

OEM discounts are available, and delivery is in 30 days, according to the Plessey spokesman.

More information on Model 6603 and Model 6703 is available from Plessey Peripherals, which is located at 17466 Daimler, Irvine, Calif. 92714.

Page Readers Announced By Compuscan

FAIRFIELD, N.J. — Compuscan, Inc. has announced the Alphaword Series 80, three modular optical character recognition page readers.

The readers were designed for desktop or pedestal use and contain a numeric keypad and a 16-character liquid crystal display. Features include friction-feed document handling and double-document detection, according to a company spokesman.

The readers reportedly can recognize the following popular typestyles: Courier 10, Courier 12, Prestige Elite, Prestige Pica, Letter Gothic and OCR-B. Each scanner supports one RS-232C-compatible, asynchronous or synchronous interface, and the scanning rates vary from 145 to 250 pages per hour.

Prices for the Series 80 begin at $12,990. More information is available from Compuscan at 81 Two Bridges Road, Fairfield, N.J. 07006.

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Kaypro Beefs Up Micro Line With Two Models

SOLANA BEACH, Calif. — Kaypro Corp. has added two models, the Kaypro II Plus 88 and the Kaypro 4 Plus 88, to its line of microcomputers.

Both systems allow users to choose between 8- or 16-bit microprocessors using either Digital Research, Inc.'s CP/M or Microsoft, Inc.'s MS-DOS operating systems. The two microcomputers are equipped with Zilog, Inc. Z80 8-bit and Intel Corp. 8088 16-bit microprocessors, the vendor said.

In the 8-bit mode, the user can operate CP/M 80 programs. In addition, 8-bit users have access to a maximum of 247K bytes of random-access memory, the vendor said.

In the 16-bit mode, users can run MS-DOS programs. In addition, main memory is expanded to 247K bytes, the vendor said.

Both the Kaypro II Plus 88 and the Kaypro 4 Plus 88 are shipped with a standard package of bundled CP/M and MS-DOS operating systems. The Kaypro II Plus 88 operates with single-sided, double-density diskettes and costs about $2,000. The Kaypro 4 Plus 88 operates with double-sided, double-density diskettes and costs $2,200, from 533 Stevens Ave., Solana Beach, Calif. 92075.

Harris Disk Drive, Controller Bow

FORT LAUDERDALE, Fla. — The Computer Systems Division of Harris Corp. has announced the Harris 5360, a 406M-byte disk drive for the firm's 700, 800 and 1000 series superminicomputers. The firm also announced the 5360 Integrated Disk Controller to support the unit.

The 5360 features a 1.9M byte/sec data transfer rate and an average seek time of 18 msec. The unit reportedly offers users a 54% faster I/O speed and up to 33% faster access time over earlier Harris disk drives.

The 5360 is rack mountable in a Harris peripheral cabinet. The drives consist of a single spindle drive motor, power supply, a sealed media module, a rotary actuator and read/write heads. Each drive contains six fixed, sealed 10.5-in. platters and 10 data recording surfaces, Harris said.

The 5360 costs $19,000, according to the vendor.

The 5360 Integrated Disk Controller provides the functions required to operate the 5360 drives with Harris superminicomputers. The unit is compatible with all other Harris disk drives and can connect up to three slave disk drives. The controller also features self diagnostics. A 5360 disk unit with the Integrated Disk Controller costs $26,000, Harris said.

A cluster of four 5360 drives plus the Integrated Disk Controller costs $80,000, Harris said from 2101 W. Cypress Creek Road, Fort Lauderdale, Fla. 33309.

Firm Adds Two Micros To Series

IRVINE, Calif. — Micro Five Corp. has added two models to its Series 1000 line of 16-bit microcomputers.

The Model 1640 features 40M bytes of disk storage, a 1M-byte diskette drive, 256K bytes of main memory, six I/O ports and a 20M-byte streaming tape drive for backup. The Model 1640 costs $16,495, the vendor said.

The Model 1740 configuration is identical to the 1640 except that it offers 80M bytes of hard disk storage. The unit costs $19,995, the vendor said.

Both models are compatible with the Micro Five Series 1000 family. The Series 1000 supports Micro Five's Stardos operating system, as well as Digital Research, Inc.'s CP/M and MP/M operating systems, the vendor said. Micro Five is located at 17791 Spy Park Circle, Irvine, Calif. 92714.

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Disk Cache System Available for IBM Micro

SAN JOSE, Calif. — Santa Clara Systems, Inc. has introduced a disk cache system and a line of internal hard disk drives for IBM Personal Computer users. The products can also be used as upgrades to the firm's external 5¼-in. hard disk drives.

The disk cache system, called Quick Disk, is an external add-on memory device that contains random-access memory (RAM) ranging from 128K bytes to 1M byte. When attached to an IBM Personal Computer, Quick Disk increases the speed and performance of Santa Clara Systems' personal computer network, called PCnet, and speeds up hard disk drives, the vendor said.

Quick Disk reportedly operates 120 times faster than a Winchester disk drive and 190 times faster than a floppy disk drive when performing common data transfers. The unit also features dynamic-error correction, the vendor said.

Quick Disk can be used independently as an additional data storage unit (such as for RAM disk or as a print buffer), or in combination with a floppy or Winchester as a disk cache.

Five models of Quick Disk are available. They range in price from $2,795 (128K-byte version) to $8,595 (1M-byte version), the vendor said.

The family of internal disk drives is designed for use with the IBM Personal Computer or Personal Computer XT. Offered in three configuration kits, the 3.9-in. drives fit into one of the IBM Personal Computer's floppy disk enclosures.

The three configurations available are: 6M bytes of removable media ($2,095); 6M bytes of removable storage with a 5¼-in., half-height floppy drive ($2,795); and 6M bytes each of removable and fixed storage ($2,995), the vendor said.

Upgrade kits that allow an internal single-drive unit to be converted into a dual-drive system are also available. An additional drive, new cabling and brackets are supplied. A half-height floppy upgrade is $905, and a 6M-byte fixed upgrade is $1,295, the vendor said.

The 6M-byte, removable cartridges are not interchangeable with the lower-capacity units. Users can upgrade existing units to the new storage capacities by purchasing a new disk controller for $475, the vendor said.

The higher capacity, 5¼-in. drives cost from $2,295 to $5,056, the vendor said.

More information is available from Santa Clara Systems at 1860 Hartog Drive, San Jose, Calif. 95131.

Printer Said To Utilize Four Links

SCOTTSDALE, Ariz. — Blue Chip Electronics, Inc. has announced the Model BCD-4015, which the company described as a 40-char./sec 132-col., high-resolution impact printer.

According to a vendor spokesman, the printer is compatible with all currently available microcomputers using interfaces offered with the BCD-4015. It is said to print 10 or 12 char./in. and is software controlled for standard word processing commands.

A daisywheel mechanism operates in a logic-seeking, bidirectional mode, printing on standard office stationery or fanfold paper, the vendor said.

The Model BCD-4015 operates on full-duplex asynchronous communications lines and includes a universal power supply. A tractor feed is included with the printer, which accommodates paper from 80 col. to 132 col. (5 to 15 in.) wide.

Four interfaces are available for use with the printer, including the Centronics Data Computer Corp. 8-bit parallel interface (supplied as standard equipment), a serial RS-232C interface, an IBM Personal Computer interface and an IEEE-488 interface, the vendor said.

The printer is available for $1,895 from Blue Chip Electronics, 7406 E. Butherus Drive, Scottsdale, Ariz. 85260.

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Falcon Offers Hard Disk Systems for IBM Micro

KENT, Wash. — Falcon Technology, Inc. has introduced a series of hard disk systems for the IBM Personal Computer.

In addition to providing either 10M or 15M bytes of mass storage, the series includes a serial port, a clock/calendar, sockets for as much as 192K bytes of additional system random-access memory and software backup utilities.

The hard disk controller, together with the added functions, occupies one system expansion slot.

The vendor has developed a proprietary circuit design that can continuously transfer data between the computer and the disk at the maximum speed of the drive. The systems can read 1M bytes from the disk in three seconds.

The Falcon Personal Computer Extender systems allow users to load programs and data 10 times faster than floppy disk-based systems, the company said. A 15M-byte extender drive provides about the same online storage as 45 floppy disks.

To resist damage from contaminants and head crashes, the systems have a thin-film plated medium, which is harder than conventional oxide coatings.

The RS-232 serial port is compatible with IBM's Asynchronous Communications Adapter. A single switch configures the port as either COM1 or COM2. Pin configuration selections can be made for direct connection to a modem, as is the case with the IBM card, or for direct connection to a printer.

For users who require additional system memory, sockets are provided for as much as 192K bytes of random-access memory. Cards accept standard 64K-byte random-access memory chips.

The Falcon Personal Computer Extender 10M-byte drive, designed to be mounted in an IBM chassis, is $2,295. The 15M-byte version is $2,595.

When mounted in a Falcon case, the 10M-byte drive is $2,495, and the 15M-byte drive is $2,795. A second 10M-byte drive in a Falcon case can be added for $1,595; the 15M-byte drive is $1895.

More information is available from the vendor at Suite T-101, 6644 S. 196th St., Kent, Wash. 98032.

SMD-Compatible Drive Out From Century Data Systems

ANAHEIM, Calif. — Century Data Systems, a subsidiary of Xerox Corp., has introduced a storage module drive (SMD)-compatible, 571M-byte, 14-in. Winchester disk drive.

According to the vendor, the AMS 571 was designed for high-performance and high-capacity storage. It combines 32K byte/track with a five-disk platter configuration. It utilizes 19 thin-film data heads capable of reading 10K bit/in.

Other features of the AMS 571 are a contamination-controlled disk compartment, a ventilated spindle for rapid temperature balancing of the disks and a dedicated landing zone.

Optional cabinets to stack two AMS 571s in a 25½-in. cabinet, or three AMS 571s in a 36-in. cabinet, allow up to 1.7G bytes of storage capacity, the company said.

In quantities of 200, the unit is priced at $8,400, which includes a basic drive, power supply, desktop enclosure and SMD interface.

More information is available from the vendor at 1270 N. Kraemer Blvd., Anaheim, Calif. 92806.

Tape Subsystems Enhanced For CDC CPUs

DENVER — Delta Systems, Inc. has announced that it is incorporating Storage Technology Corp.'s (STC) tape controllers and drives into its tape subsystems. The subsystems were designed for use with most Control Data Corp. mainframes.

The vendor's HP/T tape subsystem attaches directly to CDC channel interfaces and uses standard CDC software. The unit can also be simultaneously shared among CDC mainframes and other vendors. The vendor claims to be the first to offer STC peripherals to users of CDC mainframes.

Features of the tape subsystems include tri-density operation in a single drive, multimainframe operation, on-line diagnostics and standard 60Hz power. File transfer between CDC and IBM processors is also available, as are tape speeds from 75 to 200 in./sec. Various maintenance plans are offered either through on-site personnel or a remote diagnostic center, the vendor said.

A minimum subsystem consisting of an adapter, controller and two 125 in./sec drives costs about $90,000. More information is available from Delta Systems at 6060 W. 91st Ave., Westminster, Colo. 80030.

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Single-Bin Sheet Feeder Fits Printers, Typewriters

MERIDEN, Conn. — LQ Corp. has announced a single-bin sheet feeder designed to fit daisywheel printers, dot matrix printers and electronic typewriters used as output devices on business/personal microcomputers and other information processing systems.

The A100 automatically feeds, stacks and collates letterhead and other cut sheet paper during the printing process. A gear mounted on the printer platen shaft synchronizes the feeder to insert a fresh sheet for every 15 in. of platen motion.

Priced at $595, the A100 is available immediately for use with the following printers: NEC's 3500 and 2050 series, Computers International's Daisywriter 2000 and C. Itoh Electronics, Inc.'s F-10. The company expects the A100 to be available for other models, including the Digital Equipment Corp. LA-100, Qume Corp. Sprint 11, Diablo Systems, Inc. 620, 630 and Ricoh, Inc. 1300, by the end of the year. The company also said it can adapt the sheet feeder to other printers as well.

Further information is available from LQ at 180 Research Pkwy., Meriden, Conn. 06450.

Firm Adds to Cadmax Line

BALTIMORE — Vector Automation, Inc. has announced an entry-level two-dimensional computer-aided design and manufacturing system.

Cadmax-M is the newest member of the Cadmax family line and is said to use the same basic software as the more powerful Cadmax-II product and support most of the same options. Cadmax-M is priced at $39,500.

Cadmax-M is less expensive than Cadmax-II because it includes only a single minicomputer, a smaller workstation with separate display, keyboard and tablet assemblies, a 10M-byte disk and a floppy disk for archival storage, the vendor said. The Cadmax-M includes the same high-resolution Vector refresh display as the Cadmax-II.

Both Cadmax-M and Cadmax-II workstations reportedly can be mixed in a network that allows each operator to share data and output devices in the network. Vector Automation is located at Village of Cross Keys, Baltimore, Md. 21210.

Company Aims Tape Product At IBM Series/1

DENVILLE, N.J. — Ultimate Computer Services, Inc. (UCS) has introduced Tapesaver (USC 969 Cartridge Tape System), a method for IBM Series/1 users to store and retrieve data on ¼-in.magnetic tape cartridges.

Available in two models, Tapesaver/1 operates at speeds up to 30 in./sec (17,500 byte/sec) enabling the user to copy 67M bytes of data (capacity of one 600-ft cartridge) in one hour, while Tapesaver/2 operates at 60 in./sec (35,000 byte/sec) for copying the same amount of data in half the time, the vendor said.

For data retrieval, Tapesaver/1 can operate fast-forward or reverse at 60 in./sec and Tapesaver/2 at 90 in./sec.

Other features include high data integrity, single-bit correction, automatic error retry, automatic self-diagnostics with each tape load, write data verification and extensive log-out capabilities.

The system consists of a cartridge tape drive, controller, power supply and a single board attachment card that fits into one I/O slot on any IBM Series/1. The Tapesaver unit mounts into the IBM 4997 rack enclosure.

Tapesaver/1 costs $6,600; Tapesaver/2 lists for $6,800.

Further information is available from UCS, 30 Broad St., Denville, N.J. 07834.

MPI Introduces Portable Printer For Micro Users

SALT LAKE CITY, Utah — Micro Peripherals, Inc. (MPI) has introduced Sprinter, a portable printer designed to meet the needs of the portable computer user.

A 180-col., 160 char./sec dot matrix printer, Sprinter's standard features include an IBM Personal Computer-compatible parallel port, high-speed space skip-over, five character sets including correspondence quality, built-in friction and tractor feed mechanisms, user-programmable character design, 4K-bit buffer and full graphics capability.

Options include data buffers up to 68K bits equaling 34 pages, IEEE 488 interface, RS-232 interface and MPI's Softswitch keypad with battery backed-up random-access memory.

The data buffers for print spooling incorporate data compression buffer management, which is dynamically allocated for down-line character set loading. The standard buffer memory size is 4K bits, with options available for 20K-, 36K- and 68K bits.

Sprinter costs $795 from MPI at 4426 S. Century Drive, Salt Lake City, Utah 84107.

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Winchester Disk Drive Fits Micros

SCOTTS VALLEY, Calif. — Seagate Technology, Inc. has announced the ST212, a single-platter, 12M-byte, 5¼-in. Winchester disk drive for portable computers and desktop systems.

The company said the half-height drive incorporates ferrite read/write heads. The unit is configured with one oxide-coated disk and four read/write heads, each of which addresses 306 cylinders. The drive is said to be hardware and software compatible with Seagate's ST412 rigid disk drive.

The ST212 is said to operate at an average access time of 64 msec using a conventional stepper-motor-driven actuator. The drive has a total of 612 tracks per surface divided into two 306-cylinder bands. It will be available in early 1984 for $1,265 from Seagate Technology, 920 Disc Drive, Scotts Valley, Calif. 95066.

Mark Series Processors Out as Complete System

IRVINE, Calif. — Point 4 Data Corp. has announced its Mark Series multiuser, small business computers are now available in complete system packages.

The Mark Series processors packaged as complete systems include the Mark 2T, Mark 3, Mark 5, Mark 8 and Mark 9. The company describes Model Mark 2T as Point 4's entry-level tabletop model. The Mark 3 is a system for up to seven users, and the Mark 5 supports more than 32 users. The Mark 8 can support more than 64 users, and the Mark 9 is the firm's top-of-the-line model. The Mark 3, 5, 8 and 9 can be packaged in either a 30-in.-high or a 42-in.-high cabinet, the vendor said.

The packaged systems are priced between $16,400 and $30,000 from Point 4 Data, which is located at 2569 McCabe Way, Irvine, Calif. 92714.

Microform Primer Offered

BETHESDA, Md. — The International Information Management Congress (IMC) is offering a booklet entitled "How to Choose and Use a Microform Reader."

Available in English and French, the publication is a primer on the fundamentals of micrographics, including microfilm formats, roll microfilm and unitized microforms.

Publication IMC-137E (English) or IMC-137F (French) costs $6 from IMC, Publications Sales, P.O. Box 34404, Bethesda, Md. 20817.

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TI Expands Memory of 600A, 300 Series Systems

AUSTIN, Texas — Texas Instruments, Inc. has announced versions of its 600A and 300 series small business systems that feature expanded memory systems. In addition, the 300 series has been equipped with an Electronics Industries Association (EIA)-to-fiber-optic converter.

Designed for small businesses or branch offices of large corporations that require local processing and communications with a corporate data base, the Business System 352 features a single workstation with integral processor, disk controller and 256K bytes of error-correcting memory.

Also included is the WD500A mass storage subsystem. The WD500A consists of a 5¼-in. Winchester disk with 17M bytes of formatted storage and an 8-in. floppy disk drive with 1.2M bytes of formatted storage, the vendor said.

The operating system for the 352 is TI's DX10 3.6. The languages supported include Cobol, Fortran, Pascal and Basic. Utilities include a sort/merge feature, a data base management package and a data dictionary. The unit supports IBM 2780/3780 communications terminals. The IBM 3270 CRT terminal communications package is also supported on the 352, the vendor said.

Main memory on the 352 can be expanded to 512K bytes. Host communications and/or workstation expansion can be accomplished through the two-channel synchronous/asynchronous interface. Additional workstation interface ports can be provided with a four-channel asynchronous interface. A variety of printer products can also be supported by the 352, TI said.

The Business System 352 costs $9,995, the vendor said.

The mass storage capacity of packaged systems in the Business System 600A series ranges from 18M bytes to 126M bytes. Each 1M-byte 600A includes a Model 931 video display terminal with EIA or fiber-optic transmission capabilities.

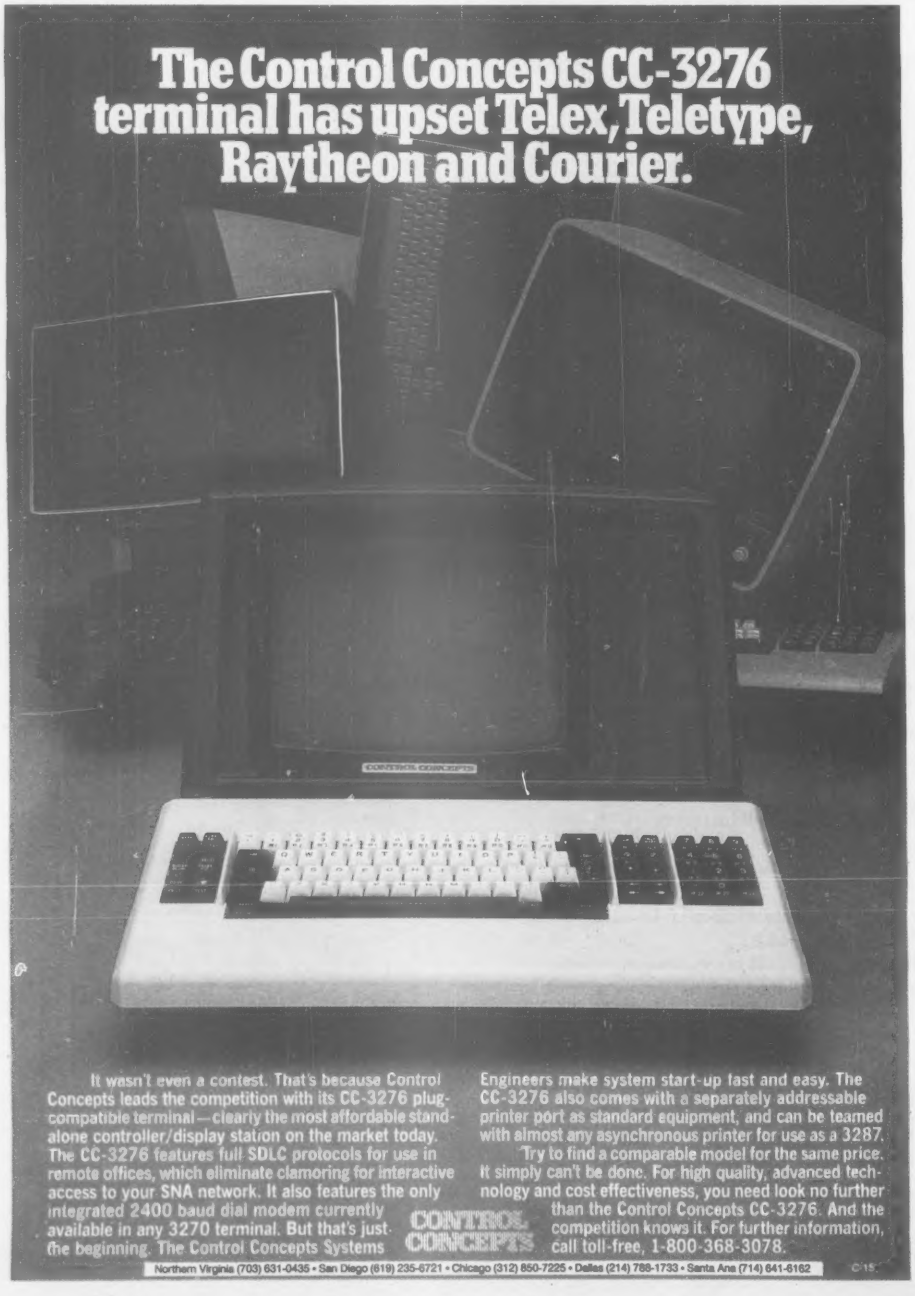
All languages, communications packages and utilities supported under TI's DX10 and Dnos operating systems on the current 600A series will be supported on the 1M-byte version, the vendor said.

Prices for the 1M-byte version of the Business System 600A, which will be available in January, range from $28,400 to $47,100.

The EIA-to-fiber-optic converter allows fiber optics to be used with EIA versions of TI's video display terminals, as well as with communications boards that do not have fiber-optic interfaces. The converter can either accept standard RS-232C signals and convert them to optical outputs or accept optical signals and convert them to RS-232C outputs.

The converter supports asynchronous full-duplex communications at standard rates of up to 38.4K bit/sec and operates at distances of up to 1,000 meters from the host computer, the vendor said.

The EIA-to-fiber-optic converter kit, consisting of the converter and a power transformer, is available for $350. More information is available from TI through P.O. Box 402430, Dallas, Texas 75240.



Memorex Offers Disk Subsystem For IBM Users

SANTA CLARA, Calif. — Memorex Corp. has announced the 3695 disk subsystem. The unit is compatible with IBM's 3375 disk drives.

The unit includes the 3695 disk storage module, the 3697 disk storage and primary controller module and the 3698 disk storage and alternate controller module.

The vendor's 3695 disk storage module contains one head disk assembly with a horizontal-axis spindle. The head disk assembly provides 819.7M bytes of data storage and is accessed by two independent actuators. Each actuator can access half, or 409.9M bytes, of the data storage space, the vendor said.

The horizontal axis of the head disk assembly allows a single motor to drive both the spindle and the air flow system. This, the vendor said, generates less heat and consumes less power than the IBM equivalent. In addition, the 3695 subsystem employs integrated large-scale integration circuitry, the vendor said.

The 3697 primary control unit contains all the interface, power sequencing and control circuits necessary to attach the subsystem to a Memorex 3888 storage control unit or an IBM 3880 control unit. The 3697 also contains a head disk assembly that provides data storage space equal to that of the 3695, the vendor said. The units offer a data transfer rate of 1.86M bytes per second and an average access time of 19 msec.

The 3695 disk storage module costs $28,770 and leases for $808 per month. The 3697 disk storage and primary controller module cost $38,040 and lease for $1,003. The 3698 disk storage and alternate controller module costs $36,290 and leases for $958/mo. All prices exclude maintenance, and lease prices are for 36-month leases.

More information is available from Memorex at San Tomas at Central Expwy., Santa Clara, Calif. 95052.

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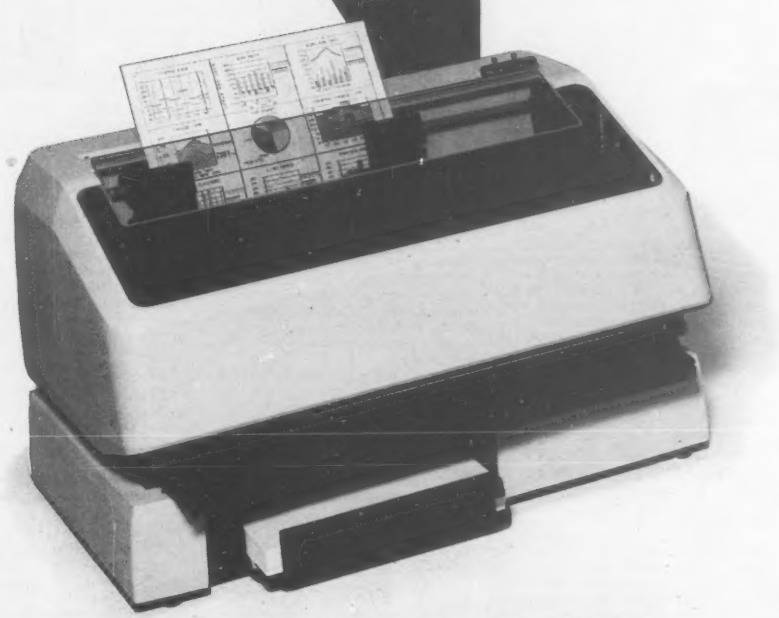

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Epson Offers QX-10 Promo

TORRANCE, Calif. — Epson America, Inc. has announced a packaged system configuration of its QX-10 personal computer with Valdocs (1.18) CP/M, the newly released RX-80 F/T dot matrix printer and a printer cable for the price of the QX-10 alone, $2,995.

The QX-10 was designed for users with no previous computer experience. It includes word processing, graphics, calculations, scheduling and electronic mail. The newest version of Valdocs has new features including variable line spacing, underlining, terminal emulation to run CP/M software and more help from the Help button.

The RX-80 F/T, the vendor's newest printer, features friction and tractor feed and 100 char./sec printing, in addition to the other capabilities of the RX-80 model.

Customers may substitute Epson's MX-80 F/T printer for the RX-80 F/T for an additional $100, according to the vendor.

More information is available from the vendor at 3415 Kashiwa St., Torrance, Calif. 90505.

Ufonic Voice Synthesizer Designed for Apple Micros

ARLINGTON HEIGHTS, Ill. — Borg-Warner Educational Systems has announced the Ufonic voice system, said to be a human-sounding voice synthesizer designed for use with Apple Computer, Inc.'s Apple II and IIe microcomputers.

The system reportedly consists of a single interface card, which will fit into any available slot in the Apple, and a small amplifier/speaker unit, which fits on top of the Apple disk drive. No additional hardware is required, and the system reportedly operates on a single disk drive.

Initial software for the Ufonic voice system offers a program that allows users to include voice in programs they write themselves.

The Ufonic voice system is priced at $495, according to the vendor. Borg-Warner Educational Systems is located at 600 W. University Drive, Arlington Heights, Ill. 60004.

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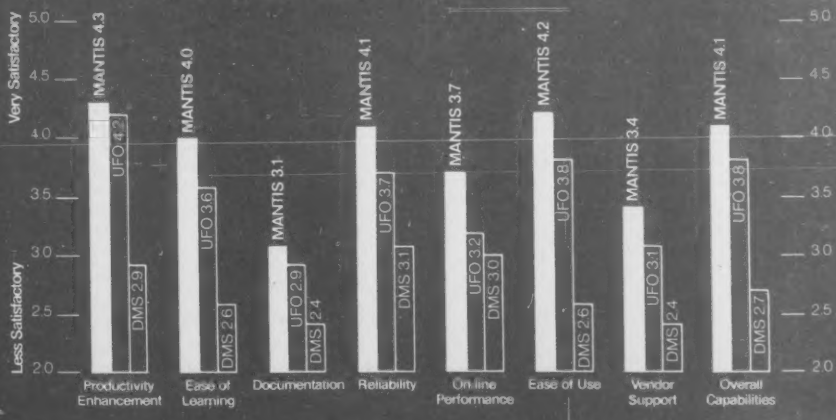

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Security System Unveiled

CHATSWORTH, Calif. — Cardkey Systems, Inc. has announced a programmable access security system designed to control and record all entry and exit privileges within any facility as well as monitor for any alarm or environmental conditions.

The Pass-3000 is able to monitor up to 10,000 card holders within its network of up to 64 reader/terminals. It consists of an operator control console housing the central processor, a Winchester drive, floppy disk drive, a video display terminal and a report/alarm printer.

The Pass-3000 system is programmed to read two personalized five-digit codes that are contained within each of its security cards. The system then records the time, card number and reader/terminal number on the card and compares it with data stored in the memory.

If the information is authorized, access is permitted; if it is not, entry is denied, and an alert appears on the dialogue printer. Pass-3000 also allows the user to limit access to various parts of a facility, as well as monitor various alarms.

The Cardkey Pass-3000 is priced in the $30,000 range. More information is available from the vendor at 20660 Bahama St., Chatsworth, Calif. 91311.

Diebold Releases MPS-1030

CANTON, Ohio — Diebold, Inc. has introduced the MPS-1030 modular proprietary security system with integrated security and data management facilities.

Basic components of the MPS-1030 include a central console, intelligent remote units and alarm sensing and activating devices. Two-way communication between the system's remote units and the central console is said to provide dedicated monitoring and control of security-sensitive points in a single building or in a network of facilities. The system is designed to alert console operators continuously of faults, operational mode changes, requests for data alarm conditions and detailed information on the status of operations at every point in the network, the company added.

The MPS-1030's data management module provides storage, control and display of security system reporting, operational procedures and management control information; it also offers a management report generating capability.

MPS-1030 messages are monitored and recorded for later retrieval. They can be searched, sorted and reviewed over the system's dedicated CRT and selectively printed for management reports. Any selected floor plans or alarm areas monitored by the MPS-1030 can also be displayed.

The MPS-1030 security and data management system can be operated over a variety of communications lines, the company said.

Diebold is located at 818 Mulberry Road S.E., Canton, Ohio 44707.

Printer Buffer Offered

NEW YORK — The Alien Group has announced the availability of a printer buffer that allows its contents to be viewed on a standard monitor.

Text throughout the Sprinter's 62K-byte memory reportedly can be rapidly accessed, allowing users to see any portion of a printout on the monitor instead of waiting for hard copy. A 12-button keypad features bidirectional scrolling, as well as the ability to jump between numerous tab points set by the user.

The Sprinter is made of heavy-gauge steel on which a monitor can be placed. It comes in both serial and parallel versions and reportedly works with any computer that drives a standard printer. The Sprinter requires no modification to the host's program and costs $550, a spokesman said. The Alien Group is located at 27 W. 23rd St., New York, N.Y. 10010.

Theft Protection System Out

LOWELL, Mass. — Stajer Corp. has developed and patented a computer protection security system said to protect microcomputers and computer peripherals from theft.

Equipment Guard CP looks like a standard multiple outlet electrical strip, but actually contains a dual theft detection security system, the vendor said. The first level of protection is located in the ac receptacles, activating an alarm if the computer's power cord is removed from the receptacle. The second level of detection reportedly is provided by special cables that attach to the peripherals and/or the microcomputer. Another alarm will sound if the cable is cut or removed. However, authorized individuals are permitted to move equipment freely.

For remote annunciation and 24-hour protection, the Equipment Guard CP is said to interface with existing central alarm systems. All units are engineered with voltage surge suppression to protect the computer against damaging ac line surges and spikes, the vendor said.

Depending upon volume purchased, Equipment Guard CP ranges in price from $126.50 to $165.50, a spokesman said. Stajer can be reached through P.O. Box 1171, Foot of John St., Lowell, Mass. 01853.

Tape Transport Ties Minis

MONROVIA, Calif. — The Kennedy Co. has announced the Model 9400 nine-track, group-code-recording tape transport that is said to provide connection to host minicomputers with Storage Technology Corp., Telex Corp. and Pertec Computer Corp. interfaces.

According to the company, the tri-density Model 9400 has a 6,250 bit/in. data density, with an unformatted capacity of 180M bytes on a 10.5-in. reel of tape. It operates at 1,600 bit/in. using phase encoding and at 800 bit/in. using nonreturn-to-zero encoding, the vendor said.

The Model 9400 is said to incorporate microprocessor-controlled diagnostics.

The transport also incorporates an RS-232 port, which allows remote diagnostics via telephone lines, the vendor said.

It is said to offer multiple processors that separate data handling and control functions.

Its analog-read chain features automatic gain-control and threshold circuits to establish the data envelope and compensate for read-amplitude variations caused by head and tape wear or differing media characteristics, the vendor said.

The Model 9400 is priced at $12,000 from Kennedy, located at 1600 Shamrock Ave., Monrovia, Calif. 91016.

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Boasts Adaptive Access Method

Local-Area Net Combines Coaxial, Fiber

WAKEFIELD, Mass. — Applitek Corp. has introduced a local-area network said to feature a 10M bit/sec data transmission speed over either broadband or baseband coaxial or fiber-optic cable connections.

The foundation of the local net is the company's Unilink network access protocol that is said to allow an "adaptive message division multiple access" method, the vendor said. This access method operates in both contention and dedicated modes with variable and fixed message lengths.

Unilink is also said to provide the quick access of carrier-sense multiple access with collision detect (CSMA/CD) systems when the network is lightly loaded with terminal-type traffic, as well as the guaranteed access of token-passing systems when traffic load increases or intelligent synchronous devices are added.

By sensing traffic and the data transmission characteristics (asynchronous, synchronous) of devices on the network, Unilink is said to provide the minimum response time for each user. It allows fixed-length packets so the network can perform like the variations of slotted time division multiple access.

Unilan from Applitek

Unilan's network interface unit, called the NI10/T, links to network devices, such as terminals, workstations, computers and printers. The design of the network interface follows the seven layers of the International Standards Organization's Open Systems Interconnect reference model.

The interface unit can operate on baseband or broadband coaxial cable or optical fiber cable, according to a vendor spokesman.

The media access unit module of the NI10/T connects the interface unit to the cable. With the appropriate media access unit, either a baseband transceiver or an optical fiber tap can connect user devices to commonly used networking cables.

Any IEEE 802-compatible baseband transceiver can be used to connect to baseband coaxial cable, the vendor claimed. It operates at a data rate of 10M bit/sec.

Deliveries of the Unilan are expected in the fall. A system supporting 200 terminals, 25 network interfaces and software will cost approximately $150,000. More information is available from Applitek at 107 Audubon Road, Wakefield, Mass. 01880.

Role of Politics Cited in WP Intro to MIS

By David Myers
CW New York Bureau

NEW YORK — The introduction of word processing in a management information systems (MIS) department demands policies and politics, not just choosing the right equipment, Association of Computing Machinery conference attendees here learned last week.

Jean A. Green-Dorsey, deputy MIS director for the New York City government, urged her fellow MIS directors to take control of all their organization's computer buying decisions and to learn negotiating skills.

"Negotiations between different departments [within the organization] must occur if you are to have a truly integrated system," Green-Dorsey said.

In another talk at the same meeting, consultant Joe Ramellini of Office Sciences Corp. agreed it was no longer enough for MIS directors to have a deep knowledge of systems.

They must also know their company's business and how to get things done within their organizations, he said.

Ramellini said the extension of an MIS director's responsibilities to include word processing forced additional responsibility upon the director for indexing all of the information within the system, for networking, for system standards and for the training of system users.

'Increasing responsibility will transform the MIS director into a politician . . . if MIS directors fail to take on the new tasks, someone else will — and will advance as a result.'

Ramellini insisted that these new problems will be "driven by business issues, not systems issues, not technological issues." The limitation of vendors' ability to produce goods limits standardization at present, he said.

This means that someone within the user organization must assume the burden of setting standards for the system, Ramellini pointed out.

Increasing responsibility will transform the MIS director into a politician. Ramellini suggested MIS directors become adept at office politics.

"Any time you get three people involved in something, you've got politics. They're inescapable," he said.

Shouldering these new responsibilities is "a pretty tall order," Ramellini granted, but he went on to say that if MIS directors fail to take on the new tasks, someone else will — and will advance as a result.

"You must adapt and change, or be swept away," Ramellini advised the listening MIS directors.

Green-Dorsey told the tangled story of setting up New York's first MIS center less than three years ago.

"We committed all the errors of office automation. The users were not involved in the choice of equipment. There was no training plan.

"They were going to put the CPU in the engineering building and have an engineer just turn it on in the morning," Green-Dorsey laughed.

But the experience taught her some valuable lessons that other MIS directors could benefit from, she said.

As a newly hired manager who sometimes had to instruct her superiors, Green-Dorsey said she had to tell herself "every morning, 'I must appear credible, I must appear credible.'"

She insisted that all purchasing decisions on computer equipment be coordinated by the city's MIS department, she said.

"We've made it a requirement that all equipment be compatible. But we are not inflexible as an MIS group," Green-Dorsey declared, saying the city owns two Apple Computer, Inc. machines for engineers who work separately and whose information is not needed by the rest of the system.

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IBM Shuttles Execs to Make Peace With CDLA

By Jake Kirchner
CW Washington Bureau

HILTON HEAD, S.C. — IBM shuttled several high-level executives into and out of this island resort late last month to try to smooth the relationship between the computer giant and its largest customer, the combined companies of the Computer Dealers and Lessors Association (CDLA).

While IBM has always had the power to make or break many CDLA members through the firm's lease and sale policies, the uneasy relationship between the two has grown more nettlesome since early 1981, when IBM set up — in partnership with Merrill, Lynch, Pierce, Fenner & Smith, Inc. and Metropolitan Life Insurance Co. — its own leasing subsidiary, IBM Credit Corp. (ICC) in direct competition with CDLA firms.

'IBM Credit Corp. . . . has no hidden agendas . . . no Machiavellian design. . . . We expect to be competitive; we expect to be fair and ethical. . . . Sometimes we will win; sometimes you will win.' — David A. Finley, president IBM Credit Corp.

Addressing the CDLA fall meeting here late last month, ICC President David A. Finley sought, through a combination of candor concerning the firm's competitive drive in general and good-humored reticence about ICC plans in detail, to assure CDLA members they have nothing more to fear from ICC than from any other powerful, well-heeled competitor.

ICC, Finley claimed, has "no hidden agendas . . . no Machiavellian design. . . . We expect to be competitive; we expect to be fair and ethical." In sum, he said, "Sometimes we will win; sometimes you will win." In the end, however, IBM's actions spoke louder than ICC's words in demonstrating IBM's desire to compete peaceably with the CDLA.

Several hours after Finley's appearance, IBM flew in a high-ranking executive from company headquarters to resolve with CDLA a months-long dispute between the two over IBM's decision to insist on payment for its equipment upon installation. Prior to June, payment was due 30 days after installation.

Besides the difficulties that new policy could have caused dealers trying to wrap up paperwork from clients, vendors and financial backers in multi-million dollar deals, association members conceded that

(Continued on Page 100)

TI Home Computer Cast Off in Light Of Financial Loss

DALLAS — Moving to limit the financial drain on its overall operations, Texas Instruments, Inc. cast off its sagging home computer operations recently, following continued losses in its consumer group.

The company announced a continuation of a nine-month slide with third-quarter losses of $110.8 million, compared with earnings of $36.9 million for the same quarter one year ago. However, the losses for the third quarter reflect a one-time charge of $330 million for getting out of the home computer business, partially offset by tax credits of $227 million. The company said it would continue to manufacture its Professional Computer, a microcomputer at the higher end of the market.

Third-quarter results brought the company's losses for the nine months ended Sept. 30 to $222.9 million and the potential for a fiscal year loss of up to $5 per share, according to one analyst. Despite large price cuts and rebates, sale of the TI 99/4A continued, according to the company.

The company's total sales were down

(Continued on Page 102)

CDC Inks Pacts With Retailers To Sell Drives for IBM Micros

MINNEAPOLIS — Control Data Corp. recently announced its entry into the retail market by signing nonexclusive agreements with Sears, Roebuck and Co. and Computerland Corp. to sell CDC disk drives for IBM and compatible microcomputers.

The two retail organizations will stock and sell CDC's Storagemaster disk drives to users of IBM Personal Computers and compatible microcomputers. The first product of the Storagemaster line is the model 409, a full-height, 5¼-in. flexible disk drive, a CDC spokesman said.

The unit reportedly stores up to 320K bytes, or up to 360K bytes with IBM's DOS 2.0 operating software, on a double-sided floppy diskette. The units will be available at Sears Business System Centers and Computerland stores beginning in November, the spokesman said.

(Continued on Page 102)

Vector Graphic Posts Third Loss

THOUSAND OAKS, Calif. — The flow of red ink and other bad news continued at Vector Graphic, Inc. as the company announced its third consecutive quarterly loss recently, losing $701,000, or 12 cents per share. Sales in the period declined nearly 10% to just over $6 million, compared with $6.7 million the same period a year ago.

In response to the continuing losses, Lore Harp, company president, announced a shortened work week for "many of its employees."

The company is continuing to evaluate "potential consolidations of departments and functions and possible reductions in personnel and other cost-reduction programs," it was announced. Earlier this year, the company let go 25% of its workers to counter losses.

The business systems maker also announced the resignation of two board members, Daniel R. Carter and Carole B. Ely for "business and personal reasons." Further, Vector Graphic announced that a class action suit against the company has been filed stemming from the sale of one

(Continued on Page 104)

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Wang Reports Earnings Rise 56% In First Quarter, Revenues Up 35%

LOWELL, Mass. — Wang Laboratories, Inc. recently reported that earnings for the first quarter ended Sept. 30 were up 56% from the corresponding period last year, with revenues increasing 35%.

Dr. An Wang, chairman and chief executive officer, announced that revenues for the quarter were $412 million, up from the $305 million reported one year ago. Net earnings, including an after-tax gain of $1.8 million resulting from the sale of marketable securities, were $39 million, or 29 cents per share, up from $25 million, or 20 cents per share, reported for the corresponding period in 1982.

For the year ended Sept. 30, Wang reported revenue of $1.64 billion, up from the $1.23 billion reported for 1982.

Despite increased competitive pricing practices within the industry and continued strengthening abroad of the U.S. dollar, the company noted, pretax and after-tax margins improved in comparison to last year's first quarter.

Second-Quarter Earnings Up $22 Million for Sperry

NEW YORK — Sperry Corp. announced recently that earnings for the second quarter ended Sept. 30 were $31.1 million, up from the $9 million recorded for the corresponding period one year ago. Revenues rose 5% to $1.24 billion, compared with $1.18 billion a year ago.

Gerald G. Prost, chairman and chief executive officer of Sperry, attributed the sharp increase in earnings to "stringent cost-cutting measures instituted over the past 18 months and better economic conditions in several of our markets."

For the six months ended Sept. 30, the company reported a 2% increase in revenue and an earnings increase of $55.7 million, up 121% for the same period in 1982. Earnings per share were 60 cents for the second quarter and $1.12 for the six-month period, compared with 20 cents and 57 cents, respectively, for the corresponding periods last year.

During the second quarter, computer systems revenue increased only 1% and electronic systems revenue increased 21%, while flight systems revenue decreased 3%. The company said backlogs of orders show significant improvement with increases of 9% in computer systems, 21% in electronic systems and 26% in flight systems.

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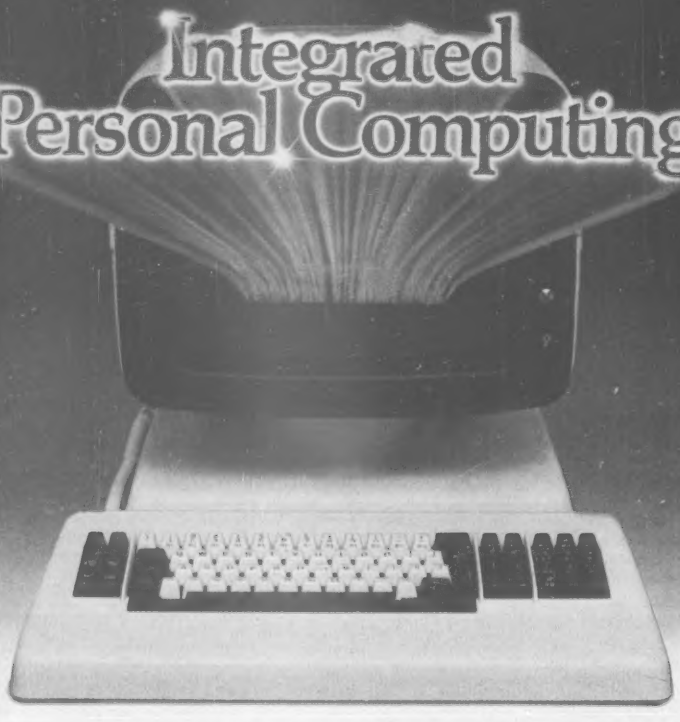

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Firm Posts 77% Rise In Earnings

TORONTO — Northern Telecom Ltd. recently reported a 77% rise in earnings for the third quarter ended Sept. 30, compared to the third quarter in 1982, even though revenues for the two periods were even.

The company reported earnings, before an extraordinary gain, of $49.5 million, or 44 cents per share, compared to $28 million, or 26 cents per share, recorded in the corresponding quarter of 1982.

The extraordinary gain resulted from a reduction of income taxes arising from the use of prior years' tax losses of a U.S. subsidiary and boosted earnings to $57.9 million, or 29 cents per share.

For the nine-month period that ended Sept. 30, earnings before extraordinary gains amounted to $183.9 million, compared to $91.1 million for the first nine months of 1982.

U.S. revenues were up 18.2% for the third quarter and 24.1% for the first nine months, compared to 1982, but Canadian revenues declined 18% for the quarter and 20.7% for the first nine months.

U.S. revenues accounted for 57.9% of the company's third-quarter consolidated revenues.

Company officials reported that they anticipate a strong fourth quarter.

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More Flexible Hiring Policies Sought

High-Tech Firms Seen Facing Manpower Crisis

By Robert Batt
CW West Coast Bureau

LOS ANGELES — High-technology companies will need to adopt far more flexible hiring policies than hitherto if they are to recruit the skilled technicians and executives they require, a management consultant here has claimed.

William Mangum, president of Thomas-Mangum Co., a firm specializing in executive search and organizational development for high-technology industries, said there is the potential for a crisis in today's manpower glut which could lead to faltering growth for many companies.

"A lot of high-technology firms have been lulled into a false sense of security by the recession, which resulted in a large pool of labor being available for hire. However, when it comes to filling critical positions in areas such as the computer, telecommunications and semiconductor markets, the market has if anything become more restrictive," he said in a recent telephone interview.

According to Mangum, the traditional shortage of skilled programmers, analysts and data processing executives has been aggravated during the recent recession by the continued high cost of housing and made even more acute by the fact that high-technology centers are located, for the most part, in cities with the highest costs of living — Los Angeles, San Diego, San Francisco, Boston, New York and Washington, D.C.

"In the past," he added, "professionals thrived on moving from one opportunity to another. Now there is little motivation to make a move and take on the responsibilities of selling one home and buying another in today's real estate market."

To entice DP professionals to make a move, Mangum asserted, companies will need to develop highly flexible hiring policies including offering creative and often expensive relocation packages to selected individuals.

For example, he said, a San Diego firm offers bridge loans to potential employees with critically needed skills. The loan, against the sale of an existing home, in effect draws out the capital in advance of the sale. Other incentives include rental-lease assistance, more lucrative per diem payments, larger salary increases, generous up-front bonuses and payment of brokers' fees.

However, Mangum noted, there is a great deal of resistance among high-technology firms to adopting such practices. A recent nationwide poll of 750 companies carried out by the consulting firm showed that many companies are offering less in the way of assistance than before the recession.

"Companies will need to offer much more than they offered last year. Our research shows that unless a company is offering a salary increase of between 15% and 30%, executives are not interested in moving. However, most companies are currently offering between 7% and 15%, and as a result they are not getting the people they need," Mangum asserted.

One possible solution to the skills shortage problem, the consultant declared, is the "growing your own" approach successfully adopted by firms such as Hewlett-Packard Co., IBM and Tektronix, Inc. These companies, Mangum said, are hiring college graduates and training them in critical skills — a slow and expensive way to solve the problem.

"If the economic recovery turns out to be sluggish, this solution may be the one that works. But if there is a strong recovery, this approach will not be the answer," he concluded.

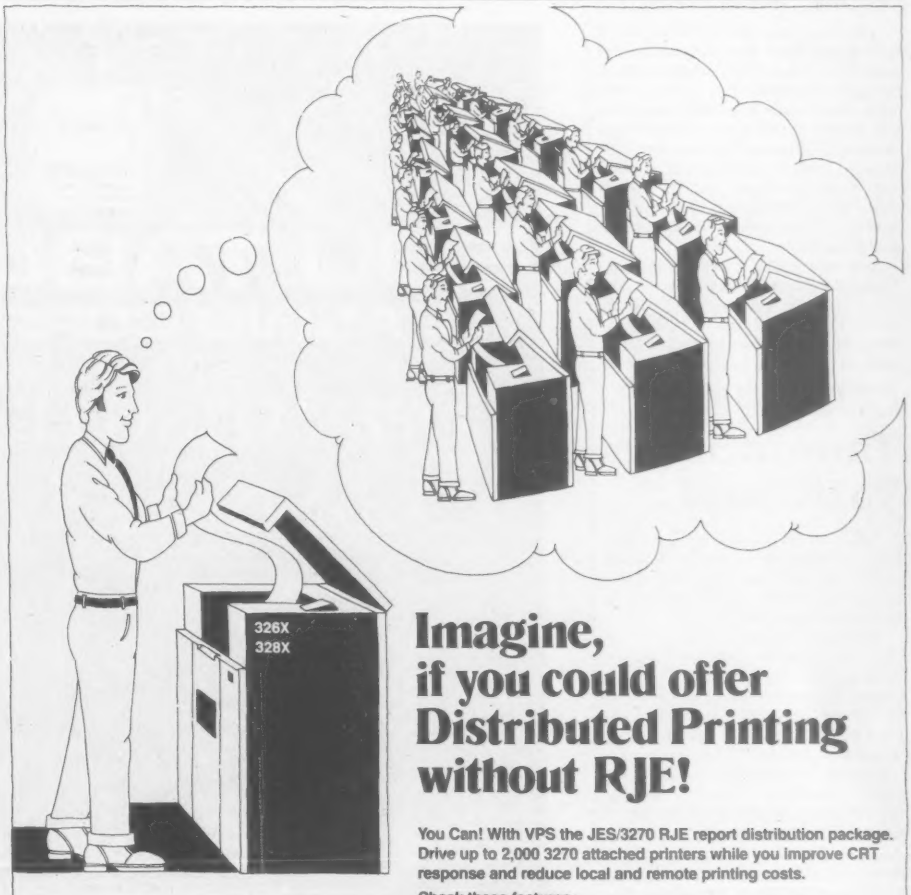
Western Union Reports Dip In Earnings

UPPER SADDLE RIVER, N.J. — Western Union Corp. recently reported earnings for the third quarter ended Sept. 30 of $16.6 million, or 60 cents per share, compared with $31.2 million, or $1.24 per share, reported for the same period one year ago.

Operating revenues also dipped, going to $261 million for the third quarter this year, compared with $280 million in the same period last year.

Income for the third quarter included $8.5 million from reversal of a reserve for amounts paid to Western Union under protest by international record carriers and $2.7 million from the sales of two transponders on Western Union's Westar VI satellite. During the third quarter of last year, the company recorded an extraordinary item in its earnings of $7.69 million and earnings from transponder sales of $27.7 million.

The company reported that earnings for the nine-month period were $66.7 million compared with $71.5 million in the corresponding period last year. Revenues for the nine-month period declined $1 million to $775 million.



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IBM Shuttles Execs to Smooth CDLA Relations

(Continued from Page 95)

the ability to retain several million dollars for 30 days before passing it on to IBM provided considerable interest income for the middlemen.

CDLA members accounted for 40% of IBM's 1982 worldwide purchase volume, according to the association. Thirty-day interest on even a small portion of that sales volume is not a small amount of money. If held by dealers, that extra income could be passed on to customers, giving them a break and the individual dealer a competitive boost, CDLA members noted. But it was the prospect of uneven enforcement — possibly causing a competitive imbalance among dealers — that most worried the CDLA, several of its members said.

'Tough' IBM Enforcement

The resulting agreement between CDLA and IBM, according to the association, is that IBM will not rescind its pay-on-installation policy, but will not enforce it until 30 days are up. In the words of one association executive, IBM committed itself to "tough," even enforcement: It will not "pull the trigger" for the first 30 days after installation, but on the 31st day, "it will pull the trigger and pull it hard."

Discussing ICC's success to date, Finley said the subsidiary has earned $22 million on income of $82 million in the first six months of 1983, compared to $31 million earned on $126 million in income last year. Since its inception in early 1981, ICC has risen to number six in the leasing industry, according to one estimate, still far behind such industry giants as Comdisco, Inc. and General Electric Credit Corp.

While some here suggested the IBM unit may have failed to meet company expectations, the concern among CDLA members clearly is for the future. With its top credit rating, and relying on IBM's huge sales force, ICC could move very aggressively and quickly to capture a larger share of the computer equipment leasing market.

Finley told the association meeting, "We are not going to drive prices [down]" to capture market share. "We do have partners; we do have investors; we do have fiscal responsibilities to them," he said.

But, he also said, "Our strategy is to sell financing through the IBM sales force." To that end, Finley said, IBM offers what he termed "a rather modest" bonus to salesmen who deliver leasing deals to ICC. He also indicated the bonus system implies salesmen eventually will have a quota for delivering these deals.

He added, however, "We do not plan to remarket ICC-leased equipment through the IBM sales force." Used equipment is a lucrative CDLA business, and ICC competition could have considerable impact.

But according to Finley, dealers, such as those in the CDLA, will be used. "We will remarket it through the used equipment market as just another player in that market — pure and simple," he said.

According to Finley, ICC is important to IBM's long-term plans. "Customer financing is an integral part of and support to our . . . business objectives," he said. CDLA can expect ICC to be competitive, but for now he said, "we're still learning."

CDLA President Richard Forsythe remarked later that "IBM is willing to spend money to get an education." Although there is an uneasy truce between ICC and its CDLA competitors at this time — while business is booming — the association obviously is still worried about what the IBM subsidiary might do after it completes its education.

CDLA Elects Three Members To Its Board

HILTON HEAD, S.C. — The Computer Dealers and Lessors Association (CDLA) elected three new members to its board of directors at its annual fall meeting here.

Elected were Lawrence G. Lyon of DSI, Inc., Denver; Gordon D. Tracy of Continental Computer Leasing Corp., Newtown, Pa.; and Tom C. Martin of Computer Financial, Inc., Hackensack, N.J, according to a spokesman for the CDLA.

George H. Heilborn of IPS Computer Marketing Corp., Paramus, N.J., will reportedly serve one more year as CDLA chairman, and Richard A. Forsythe of Forsythe/McArthur Associates, Inc. in Chicago will continue as association president, the spokesman said.

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CDLA Cites Available Investment Capital

Users Seen Cashing in on Leasing Competition

By Jake Kirchner
CW Washington Bureau

HILTON HEAD, S.C. — Widespread availability of investment capital and the increasingly competitive presence of the IBM Credit Corp. in the computer leasing industry are adding up to a very favorable situation for the DP community, according to members of the Computer Dealers and Lessors Association (CDLA).

With many sources of capital for middlemen to turn to and with dealers looking over their shoulders as IBM Credit grabs for greater market share of IBM and, in the future, non-IBM equipment leasing deals, the users are enjoying "the best of all worlds," said Richard A. Forsythe, chairman of Forsythe/McArthur Associates, Inc. of Chicago and CDLA president.

With increasing competition from IBM Credit, founded in March 1981, "everybody's beating their brains out to get [users'] business," Forsythe said, adding, "if there's anyone [who] wins, it's the user."

Despite the greater competition in the leasing market, the mood of the association membership as it met here late last month for the CDLA's annual fall meeting was one of strong optimism. CDLA members' business is up 28% this year over 1982 and running at about $4 billion in annual equipment rentals.

Unlike a year ago when recession-scarce capital made computer deals harder to swing as the year ended, the market is now flush with money for CDLA business. Kenneth B. Steinback of Computer Sales International, Inc., a CDLA director, commented, "The lenders today love our business." Forsythe agreed, saying, "Money is all over the place looking for a home right now." He added that the computer leasing business is seeing more and more "big money" — large investors looking for large computer deals to finance.

The association, coming off of a successful year and looking ahead eagerly to an even better year expected with the continuing economic recovery, seems to have arrived at a fairly comfortable if not totally secure modus vivendi with IBM Credit [see story on Page 95]. Forsythe, noting the competitiveness of IBM Credit, said profit margins for CDLA firms are getting narrower and narrower but added that there are a lot more deals being made, which adds up to increased revenues for the association's members.

Discussing how the IBM Credit-CDLA competition is shaping up, Forsythe and Steinback said association members seem to be getting the bulk of the deals on peripherals, which the firms find more lucrative than CPU deals because peripherals retain more residual value at the end of the lease term than CPUs. IBM Credit, on the other hand, is going after and getting "those four- and five-year CPU deals," Forsythe said, suggesting it is doing so because it is easier to remarket a few expensive CPUs than thousands of disk drives.

The result, Forsythe said of the CDLA membership, is that "we seem to be losing [to IBM Credit] the deals we don't mind losing, and we're winning the deals we really want."

Brightening the Outlook

Further brightening the outlook of the association in terms of IBM Credit competition is the possibility the IBM subsidiary will become a source of capital that CDLA firms can tap to finance deals on non-IBM equipment.

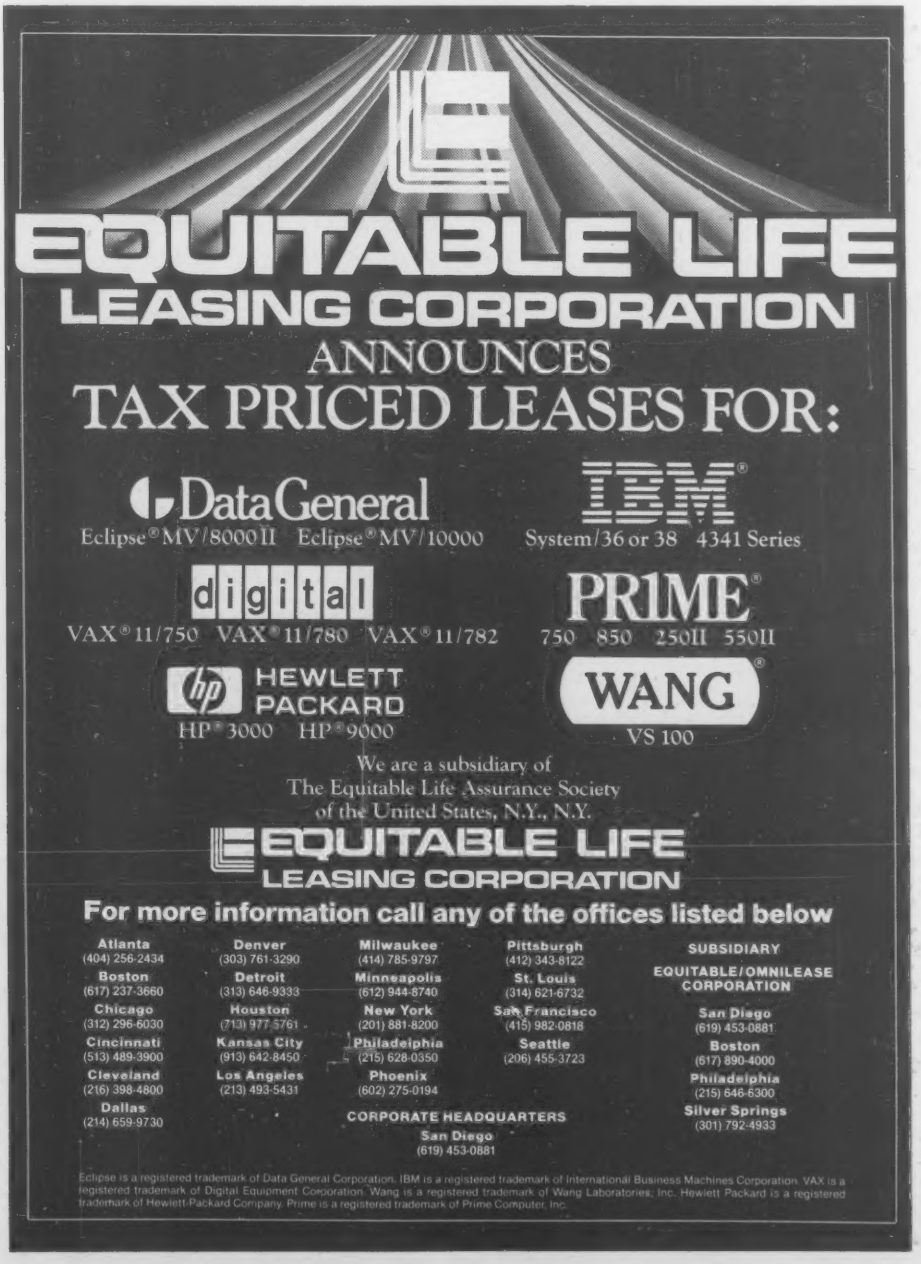
While IBM Credit President David A. Finely was fairly circumspect in his comments to the meeting here about his company's intentions in this regard, he did confirm that IBM Credit's recently announced deal with Bankamerilease is leading IBM Credit in the direction of financing non-IBM equipment acquisitions.

Finley said IBM Credit at this time does not have the staff to deal with non-IBM proposals brought to the company by outside brokers. But, he said, "it's not unreasonable to think that sometime in the future we will be much more interested than we are now."

Certainly CDLA members are aware that IBM Credit, backed by the financial resources of IBM's partners, Merrill Lynch and Metropolitan Life, and armed with the marketing power of the IBM sales force, could greatly increase its market share and make life very difficult for its independent competitors. But for the time being, at least, the game seems large enough for all players.

If anything clouded the CDLA horizon it was the recent furor touched off in the computer leasing industry by an article in *Barrons* last month questioning the accounting practices of industry leader Comdisco, Inc. [CW, Oct. 17].

The most troublesome aspect of the *Barrons* article, Steinback said, is the fact that Comdisco is not accused of perpetrating any fraud. The questions raised, he said, deal only with interpretation of federal accounting practices and standards.



Cincom Touts Software to Bridge IBM-DEC Gap

CINCINNATI — The reality in the business world is that corporate headquarters tend to use IBM mainframes, but subsidiaries and divisions in the field like the performance and interactive aspects of Digital Equipment Corp.'s VAX series superminicomputers.

At least that's the thinking behind Cincom Systems, Inc.'s recent [CW, Sept. 26] announcement of an "IBM-DEC connection" that reportedly will be able to "bridge the gap between DEC and IBM hardware environments for corporations using both types of equipment."

Cincom's DEC end of the connection is the recently announced Ultra Interactive Data Base System. The company said that applications written for Ultra can "with little or no change" be run on its Total Information System (TIS) package for IBM mainframes.

Cincom has traditionally produced software for the IBM user market, and the move into the DEC environment signals a major change. According to Dennis Yablonsky, director of marketing and sales at Cincom, the company "sees a major market for DEC equipment." He noted that DEC estimates the sale of 19,000 VAX units in 1983.

While IBM mainframes dominate the headquarters of the $100 million-and-up companies to which Cincom targets its products, Yablonsky said the company has found that many subsidiaries and divisions of those companies have selected DEC units because of their "interactive computing ability."

Ultra reportedly provides relational technology to VAX data base applications and a set of user tools in common with the TIS package. "There is a logical user view implemented on both TIS and Ultra," Yablonsky said.

Cincom writes its programs in Cobol, and Yablonsky said transferring programs between DEC and IBM units involves "nothing other than having to recompile." The process could take a few hours to a day, he said, "but it's not a three-month process."

Apparently Cincom is the first software house to make this "connection," and Yablonsky said he was unsure why others have not stepped in.

"There is a demand out there for programs that are compatible on IBM and DEC equipment," Yablonsky maintained.

Facing Losses, TI Backs Out Of Micro Mart

(Continued from Page 95)

4% for the third quarter and 2% for the nine-month period, while sales in divisions other than the consumer group rose 11%. The company's breadwinners, semiconductor circuits and defense electronics, continued their strong growth with an increase in back orders of $66 million, the company reported.

Mark Shepherd Jr., chairman, and J. Fred Bucy, president, said in a joint statement, "The first nine months of 1983 have been the most difficult period in the history of TI."

Some 4,000 employees may be affected by the decision, and there has been some speculation that the company's semiconductor sales may feel some impact from the loss of one of its best customers, the TI consumer group.

Michael A. Gumport, an analyst of semiconductor stocks for Paine Webber Mitchell Hutchins, Inc., said he expects the company to post strong earnings in the 1985 fiscal year in the range of $10.50. "The impact is as expected," he said. "The only surprise was how large the write-off was." Asked if this signals TI's exit from the home electronics market, Gumport replied, "You'd hope so."

CDC Signs Pacts With Retailers To Sell Drives

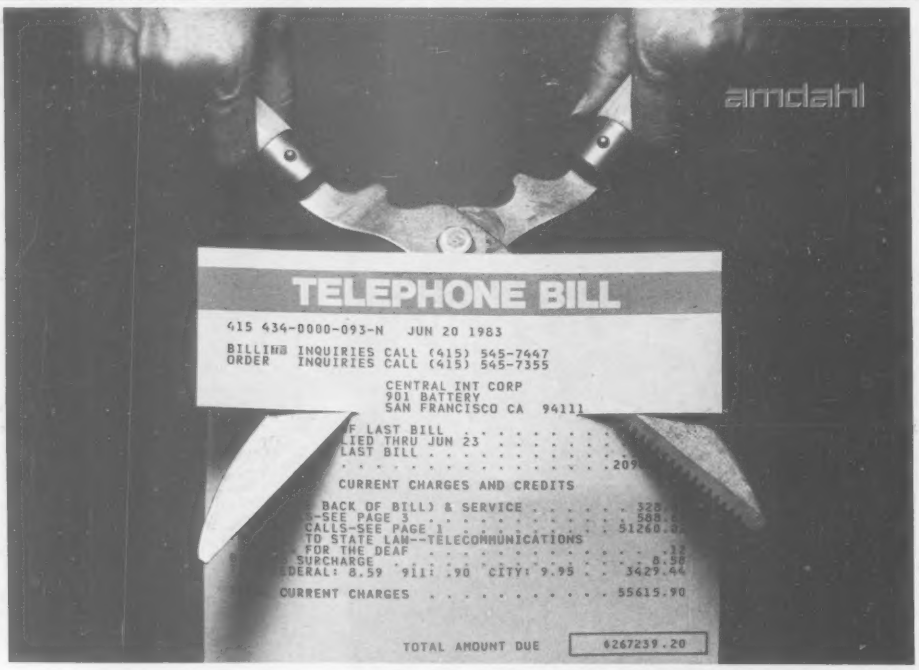
(Continued from Page 95)

CDC is looking at the potential for marketing other peripherals, "but has no specific products identified yet or any timetable established," the spokesman said.

The company has established a Microperipheral Systems organization with responsibility for the new retail marketing program. The group will also be in charge of direct sales of Storagemaster peripherals to high-volume end users of the IBM Personal Computer and compatible systems and will establish a commercial distributor program for the products, the spokesman said.

Donald R. Anders, director of Microperipheral Systems, said, "We want to establish [CDC] as the alternative peripheral supplier to this segment of the microcomputer market that today is demanding greater capacity and efficiency in data storage."

David L. Point, general sales manager of the division, said, "We have been and are continuing to make substantial investments in disk technology that will ensure very competitive products for the personal computer market."



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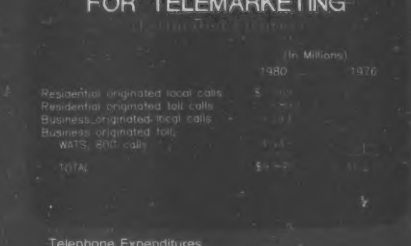

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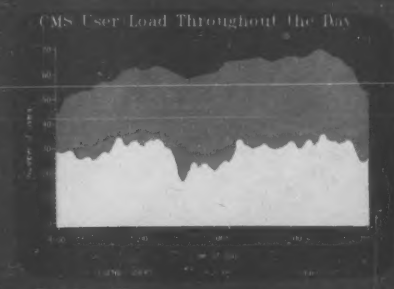

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House Approves Relaxed Export Controls

WASHINGTON, D.C. — In the midst of a continued standoff on renewal of the expired Export Administration Act, the U.S. House of Representatives recently approved what is considered a liberalized version relaxing controls on the shipment of goods to non-Eastern bloc countries.

Under one key provision of the House-approved bill, U.S. firms would be able to ship controlled high-technology items to countries with membership in the Free World Coordinating Committee without having to obtain individually approved export licenses. The 223 to 188 vote in the House reversed a stricter bill that had been approved earlier in the month that would have granted the Secretary of Commerce discretion to require individual licenses in such cases.

The bill would, however, require exporters to report each shipment to the Commerce Department along with details on destination and the designated customer. An amendment approved by the House would also prohibit further investments in South Africa by U.S. companies until that country relaxes its apartheid laws and regulations.

The Senate, which allowed the act to expire Oct. 14 when it failed to pass an extension, has yet to act on a version of the bill that would place stricter export restrictions than previously existed. Provisions of the act are being enforced under a presidential executive order.

Pact Would Enhance SL-10, VAX-11 Link

NASHVILLE, Tenn. — An agreement to provide enhanced communication between Northern Telecom, Inc.'s .SL-10 packet switch and Digital Equipment Corp.'s VAX-11 series of superminicomputers was recently announced.

The agreement is designed to deliver an integrated systems approach through which value-added office services can be handled with optimum efficiency across a wide geographic area, a Northern Telecom spokesman said. Services to be supported over the SL-10 equipment reportedly will include DEC's Decmail electronic mail application and All-In-1 office automation package.

The spokesman said the companies are presently defining, testing and enhancing the network connection between their respective equipment. Earlier this year, the two companies announced a computer-to-private branch exchange interface specification.

Vector Airs Third Loss In Revenues

(Continued from Page 95)

million shares of common stock two years ago. The plaintiff in the suit filed a similar pleading against Vector Graphic earlier this year.

Company founder Harp, who reassumed control of daily operations last April, blamed buyer confusion caused by "adverse publicity" for part of the company's misfortunes.

"We believe widespread speculation by the media concerning the future of companies such as Vector had a detrimental effect on sales during September," she said.

Vector Graphic and other makers of small business systems have suffered severe setbacks both in the value of their outstanding shares and in system sales in the past three quarters.

After achieving startling market successes through 1982, Vector Graphic lost $1.67 million last quarter and $1.1 million the previous quarter, losing nearly $3 million for the year ended June 30, a spokesman for the company reported.

Cmos Key to Billion Dollar Mark, AMD Says

By Robert Batt
CW West Coast Bureau

SANTA CLARA, Calif.—Advanced Micro Devices, Inc. (AMD) will become a $1 billion company in less than two years, with complementary metallic oxide semiconductor products (Cmos) accounting for 20% of sales, company president Jerry Sanders predicted here recently.

Speaking at a security analyst meeting, Sanders, who is also AMD chairman and chief executive, said the company expects sales in excess of $300 million in the second half of its current fiscal year (1984) to add to the $230.5 million it recorded in the first two quarters ending Sept. 30. In fiscal 1983, AMD had net sales of $358.3 million.

Sanders claimed the key to AMD's rapid growth was its willingness to invest in research and development activities during the recent prolonged recession. "Boom times are here again," he told his audience.

AMD was recently ranked fifth among manufacturers of integrated circuits by Integrated Circuit Engineering Corp., a Scottsdale, Ariz.-based market research firm. Last year AMD was ranked seventh in this sector.

Sanders said the company spent 19.4% of its revenues on R&D in 1983, with this figure rising to 21%, or nearly $22 million, in the first quarter of the current fiscal year. By the end of fiscal 1984, AMD will have spent $125 million on capital expenditure, he predicted.

This activity, Sanders added, has resulted in AMD proprietary products accounting for 38% of sales in the quarter just ended. "We have gained acceptance as an innovator, and this allows us to attract new customers and grow. For example, 72% of AMD products sold in Japan have been invented within the company. The equivalent figure for Europe is 42%. It is very important for our protection in world markets that we continue to produce our own products," he explained.

AMD, the chief executive continued, is committed to being the major large-scale and very large-scale integration (VLSI) manufacturer within the current decade. In this connection, he said, Cmos is the tool of the future, with the Cmos market expected to reach $2.3 billion in 1986.

"AMD has a major development under way in Cmos that is expected to bear fruit in 1984," he asserted, referring to the construction of a 200,000-sq ft Cmos facility in Austin, Texas.

Cmos Dominant

Expanding on this theme, James Downey, senior vice-president of operations, told the analysts that Cmos will be the dominant technology in the company's drive to become the leader in VLSI technology over the next few years.

At its recent annual meeting, the company announced its intention to introduce later this year its first Cmos products including a 16K byte Cmos static random-access memory (RAM), the first in a family of Cmos static RAMs to complement its existing N-channel metallic oxide semiconductor (Nmos) family.

Explaining the company's decision to focus on Cmos, Downey proclaimed: "Cmos is a performance and cost extension of mainstream MOS technology in the VLSI domain.

More gates can be put on a chip with Cmos than with Nmos, leading to lower power dissipation, lower packaging costs and higher device reliability." The company's current technology mix is about 55% bipolar products and 45% MOS.

The company said it also believes the future in dynamic RAMs is Cmos and, as a result, AMD has announced plans to enter the 256K dynamic RAM market with a second-generation product to be sampled in January 1985.

In addition, Downey revealed that a computer-aided design (CAD) supported Cmos macrocell family is being developed to form the design technologies for future logic products.

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Nov. 10
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Nov. 30
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Cleveland, OH
Detroit, MI

Dec. 1
St. Louis, MO
Grand Rapids, MI

Dec. 5
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Philadelphia, PA

Nov. 29
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Pittsburgh, PA
Nashville, TN
Milwaukee, WI

Nov. 30
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Cleveland, OH
Detroit, MI

Dec. 1
St. Louis, MO
Grand Rapids, MI

Dec. 5
White Plains, NY

Dec. 6
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Nov. 30
Los Angeles, CA

Dec. 1
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Dec. 6
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Jan. 10
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Legal Expenses Blamed For Paradyne Decline

LARGO, Fla. — Paradyne Corp. blamed the mounting legal expense incurred in defending federal government charges against it for its third-quarter 89% earnings slide.

Earnings fell to $804,000, or four cents per share, compared with $7 million, or 32 cents per share, the same period a year earlier. Revenues also declined slightly, dropping to $50 million from $52 million.

The decline in earnings reflects some $700,000 in legal expenses relating to Paradyne's defense of charges against it brought by the federal Securities and Exchange Commission (SEC) last March.

The SEC charged, among other things, that Paradyne mislabeled its equipment in a demonstration of its system capabilities prior to being awarded a contract by the Social Security Administration (SSA). Defense of the charges cost Paradyne nearly $1 million in its second quarter, when the company posted a $929,000 loss.

Paradyne recently filed a countercomplaint in federal district court, charging members of the SEC with "fraud, deceit and trickery" in the course of the investigation leading to the filing of the original complaint.

Paradyne's counterclaim asserted that SEC officials falsified evidence in preparing the SEC's case. The counterclaim charges further that the SEC attempted to coerce members of the SSA to make false statements against Paradyne.

Shortly after the SEC's suit was filed, a spokesman for the SSA made public statements that, in part, refuted what the SEC had charged, particularly as the suit related to the performance of some of Paradyne's systems that were already installed.

The counterclaim also stated that the SEC allowed Paradyne's competitors to view company secrets, while urging the SSA to cancel a software contract with Paradyne.

MCI's Fiscal Program To Cover Microwave

WASHINGTON, D.C. — MCI Communications Corp. recently announced a $1.1 billion capital spending program for the current fiscal year, including an upgrade and expansion of its microwave communications network.

The company said it will install a single-sideband radio system, add digital radios to existing analog routes and upgrade approximately 2,000 of its existing microwave antennae.

"The additional capacity and versatility that we will obtain from these upgrades will provide required capacity for growth," according to V. Orville Wright, MCI president.

"They are part of our overall design to enable MCI to handle the increased demand for services we expect to occur with the breakup of the Bell system," he said.

The company said the single-sideband radio system will more than double the voice channels used in present FM systems. Scheduled for completion in 1984 and initially slated for Irving, Texas, to Los Angeles, the single-sideband technology will reportedly increase MCI's voice-circuit capability from 14,700 per radio route to 37,800.

The company will add 4 GHz digital radios to existing 6 GHz routes and will reportedly operate at the rate of 90 million bit/sec. The radios were developed by Northern Telecom, Inc. and Rockwell International Corp. and will have twice the bandwidth efficiency of other radios operating in that band, according to MCI.

Existing microwave antennae will be upgraded to a dual-band system to transmit and receive signals in the 6 GHz and 4 GHz common-carrier frequency bands, the company said.

The antennae are being developed by Thomson-CSF and the Andrew Corp.

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Memorex Acquires Rights To Make, Sell DMA Drive

SANTA CLARA, Calif. — Memorex Corp. recently acquired manufacturing rights for DMA Systems Corp.'s Micro-Magnum 5¼-in. fixed/removable Winchester disk drive family and a half-height 5¼-in. Winchester cartridge disk drive.

The companies jointly announced the signing of a licensing agreement under which DMA granted the rights to Memorex, a subsidiary of Burroughs Corp.

Under the terms of the agreement, Memorex will manufacture and market the half-height drive as the Memorex 450, while DMA will manufacture and market it as the DMA 360.

According to Dr. James C. Castle, executive vice-president of Memorex, the agreement resulted when Memorex decided to exercise options contained in an agreement signed last January. "At that time, Memorex and DMA Systems agreed to fund jointly the product development that led to the new half-height drive," he said, adding that the design was developed to jointly agreed upon specifications by the DMA engineering staff headed by DMA Engineering Vice-President Dave Sutton.

CSC to Manage AT&T's Tirks For Five Years

EL SEGUNDO, Calif. — Computer Sciences Corp. (CSC) recently announced it has been contracted to manage for five years a computer applications system for AT&T Communications, a deal CSC said is potentially worth more than $30 million.

The company will maintain and further enhance the Trunks Integrated Records Keeping System (Tirks) at AT&T Communications' data center in Cincinnati.

Developed by Bell Laboratories with CSC's assistance over the past 15 years for use by Bell operating companies, Tirks is said to be the largest application system in commercial use, containing more than 350 data bases, 18,610 software modules and five million lines of code.

The system manages the provisioning and planning of telephone circuits, facilities and equipment.

After divestiture of the Bell system, Tirks will come under the supervision of the Central Services Organization, formed by the Bell operating companies, and will be supported by CSC.

A CSC spokesman said the contract calls for the company to take full responsibility for the continued development of the system, including any customization required by the post-divestiture environment.

IBM Unifies Info Services

RYE BROOK, N.Y. — IBM announced recently it has combined the activities of three of its independent business units to form a new unit, the IBM Information Services.

The three units combined were: IBM Information Network, which offers remote computing services and networking; Information Programming Services, which develops, acquires and supports computer programs and services; and Information Systems Services, which customizes programs for IBM systems' users and provides consulting services.

According to a vendor spokesman, combining the activities of the three units under single management will enable the company to achieve new efficiencies and provide a full, coordinated line of information services to customers.

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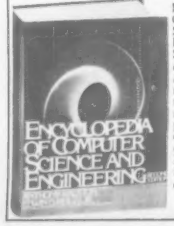

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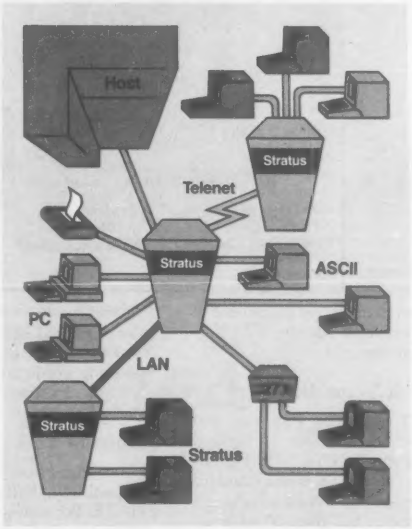

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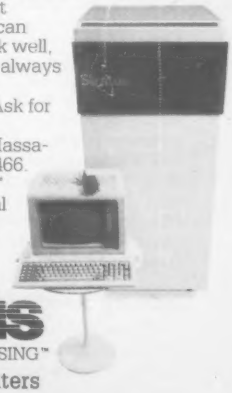

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Forecasts & Findings

Simplify Price Setting

Lack of quality data, misunderstood user requirements and major shifts in delivery modes are complicating price setting for processing services and integrated systems, according to the first volume of a two-volume report on "Information Services Pricing."

According to the report, remote computing services vendors have little room to maneuver in the face of declining profitability and prospects of losing users, but the vendors should simplify their price schedules and determine the requirements of users.

Batch and facilities management vendors are too cautious in setting prices, but do not place enough importance on knowledge about users' applications, according to the report.

In the area of integrated systems, available software and after-sales support are two of the most important purchasing criteria, and users will pay for critical applications.

The report contains data on which applications are valued by users, preferred pricing methods and other concerns.

Priced at $2,000, the report is available from Input, Inc., 1943 Landings Drive, Mountain View, Calif. 94043.

Open Nets Preferred

Open, or multivendor, networks are preferred to proprietary networks by 62% of network buyers, and 88% of the users prefer to use a third-party maintenance group for service when the principal network contractor is unwilling to maintain the entire network, according to a report from International Data Corp. (IDC).

"Network Support" concludes that network users are becoming more aware of the need for a comprehensive approach to maintenance and that service providers are in many instances overlooking potential profit areas where users are willing to pay for service; with many vendors refusing to support foreign equipment, a potential windfall exists for third-party groups willing to commit to support such systems.

According to the report, most users surveyed would not hesitate to seek third-party groups capable and willing to support an open network.

Priced at $3,000, the report is available from IDC at Five Speen St., Framingham, Mass. 01701.

Big Three Profits Up

IBM, Apple Computer, Inc. and Radio Shack Corp. will each draw revenues in excess of $1 billion for personal computer hardware and software sales with IBM topping the list at $1.5 billion, according to the "Personal Computer Industry Report."

While only 7% of U.S. office workers will have personal computers by the end of the year and less than 10% of U.S. households will have home computers, the report projects that by 1990, 40% of office workers will have at least one personal computer, and many will be using portable, battery-powered units in addition to desktops. According to the report, two-thirds of all households will use home computers by then. Eventually, the report states, 75% of office workers will use a personal computer.

The report provides historical data and forecasts for each category of personal and home computer. It is priced at $3,000 for the first copy and $300 for each additional copy by Future Computing, Inc., 900 Canyon Creek Center, Richardson, Texas 75080.

UK Telemart to Grow

The next 10 years will provide big opportunities for equipment suppliers as the UK telecommunications environment is liberalized and new technologies emerge to more than quadruple the present market, according to a report by International Resource Development, Inc. (IRD).

Where now half of the UK market is comprised of cable and public exchanges, by 1993 the two will account for less than 10%, as cable television, business peripherals

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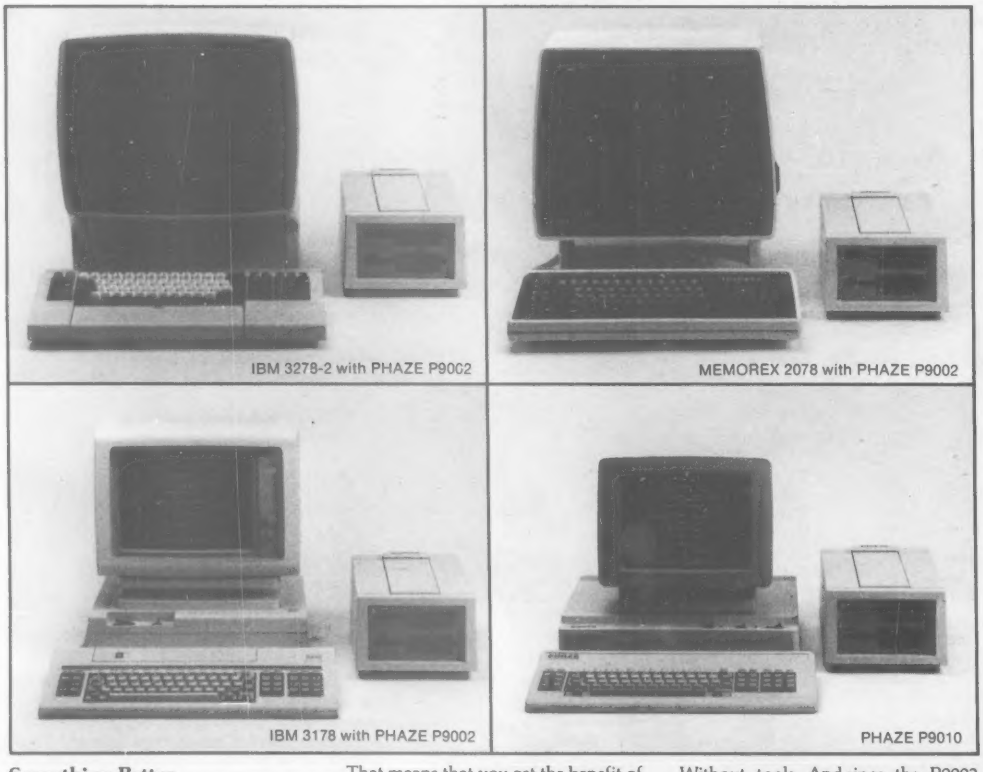

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Forecasts & Findings

and satellite communications emerge. The report notes that British Telecom is moving away from traditional suppliers and that the government's majority stockholding in the company will be sold to private stockholders.

The report notes similarities and differences between the telecommunications market in the U.S. and UK.

The report sees almost a doubling in sales by 1985 and reviews market segments and 14 traditional and emerging suppliers. "UK Telecommunications Market Opportunities" is available for $1,650 from IRD at 30 High St., Norwalk, Conn. 06851.

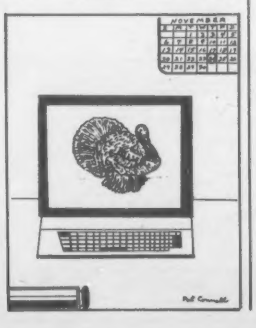
Japan's Micros Gaining

Although Japanese firms have been largely unsuccessful in penetrating the burgeoning microcomputer market because of poor planning and lack of adequate software and hardware, the installed base of Japanese systems will total 1.5 million units in 1983, up 123% from a year ago, and systems produced for export will increase by 227% to account for 16% of all production, according to a report by Competitive Strategies International (CSI).

Many export units produced by Japanese firms cannot be identified in European and U.S. shipment calculations because they are sold under other names through OEMs, according to the report.

While U.S. companies do not fear the Japanese micro manufacturers as much as they did three years ago, the report said government research and development subsidization, product imitation and production cost advantages have increased the threat.

The report notes that software has become a targeted industry in Japan, with an all-out effort under way to create new programming technology and language application programs. "The Japanese Microcomputer Industry" is priced at $1,450 by CSI, located at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.



New Features Added

New features are being added to established fourth-generation languages, including mainframe languages with versions that run on personal computers, inefficiencies that hampered earlier efforts are being refined out and some vendors are developing entirely new languages aimed at personal computers.

What that means, according to "Opportunities in Fourth-Generation Languages," is that fourth-generation languages are moving toward a prominent role in mainline information systems tasks and might turn out to be the means of reducing the enormous backlog of application development in corporate information systems departments.

The report from Input, Inc. describes nine fourth-generation languages and examines the impact they can have on management information systems operations, including costs and benefits.

The report also looks at the future effects of higher language use, such as the number of programmers using the languages climbing 680% by 1985 and nonprogrammers using the languages climbing 990% over the same period.

Other areas examined are the possible demise of experienced Cobol programmers and the transfer of technically adept personnel into the informations systems department.

The report is priced at $2,000 by Input, 1943 Landings Drive, Mountain View, Calif. 94043.

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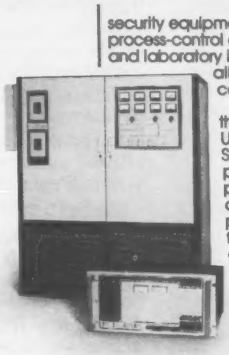

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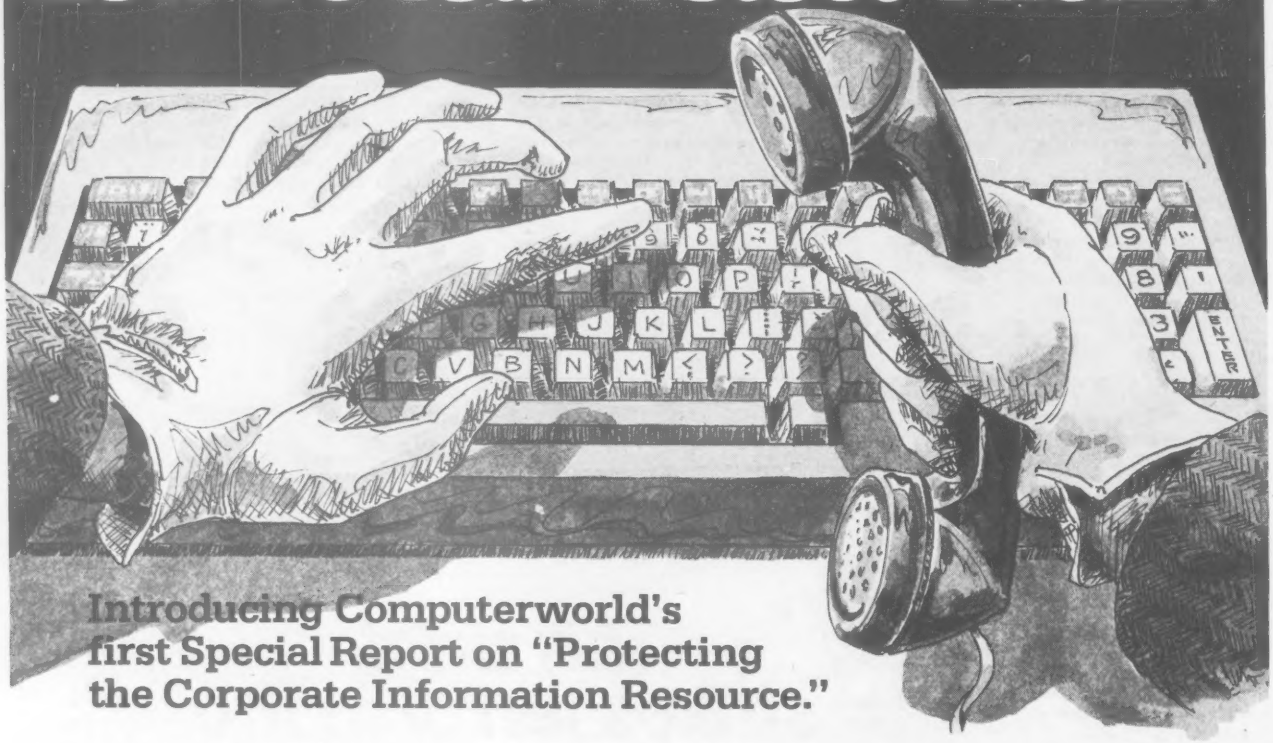

Introducing Computerworld's first Special Report on "Protecting the Corporate Information Resource."

Now that you've got it, how do you keep it safe? Just attending the seminars on security won't do it. With more personal and desktop computers around, you need security systems more than you ever did before. Every technological advance in communications means more and greater threats to secured data. You've read the stories on security nightmares — but knowing the problems isn't enough. This November 28th, ***Computerworld*** will give you what you need to get your security systems locked down tight.

Computerworld's Special Report on "Protecting the Corporate Information Resource" will look at the products, the systems, and the methods companies use to keep their resources safe:

- uninterruptible power supplies
- disaster recovery centers
- data transmission security
- cryptography

"Protecting the Corporate Information Resource" will deal with security issues from electronic funds transfers to disaster recovery. You'll read about one company's contingency plan and another's experience with verifying operations problems at remote sites. We'll cover DP personnel security and DP security for micros. You'll get advice on contingency planning, and software protection devices.

If you need to know how to protect your company's MIS/DP assets — then ***Computerworld's*** first-ever Special Report on security issues is what you need.

Ad deadline for "Protecting the Corporate Information Resource" is November 11th. Call Don Fagan, Vice President, Sales/Marketing; Ed Marecki, National Sales Director or Kathy Doyle, Marketing Support Manager at (617) 879-0700. Or call one of the sales offices listed below:

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Boston-Area Opportunities

The following positions are at Nixdorf offices located in the Boston area on the Route 128 high technology belt.

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Several challenging opportunities exist to provide technical software and communications support to our field organization. Working closely with several departments, you will also be involved with service planning for our 8860 distributed processor. Your background should reflect an in-depth knowledge of communication protocols including Bisync, SNA, SDLC, etc. A working knowledge of assembler language, prior software development or support experience in the communications environment is desirable. Some domestic or international travel may be required. **Ref. #8058**

National Product Specialists

A number of exciting opportunities are available in our Product Line Management organization to assume responsibility for technical software marketing/sales support to various functions. Qualifications require prior networking and communication protocol experience (Bisync, X.25, SNA, etc.), knowledge of PDP-11, VAX, SERIES 1, NOVA or equivalent minicomputer exposure. POS/Banking background very desirable. Marketing background a plus, however, positions warrant heavy technical expertise. **Ref. #6300**

POS Product Line Marketing Specialists

A variety of marketing/technical positions are available in the POS marketplace. Some positions require a hardware engineering background and will be responsible for product planning and functional specifications for product development and enhancements. Other positions require a software/ marketing orientation to focus on market data evaluation and competitive analysis. Candidates should have 3-5 years' experience in product management and/or product marketing in the retail marketplace, i.e., restaurant, hotel, department store. A 4 year degree in computer science or engineering, or equivalent, is required. MBA desirable. **Ref. #6151B**

Program Managers

Opportunities exist for high level professionals to manage operations associated with installing large computer systems in varied special business applications. Successful candidates will direct activities both at customer sites and for Nixdorf in-house efforts with total profit and loss responsibility. A minimum of 3-5 years' experience in program management with large computer systems utilizing large amounts of special application software and a BS or MS in electronics or computer science desired. **Ref. #6151F**

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To provide operating system support to Field Engineering Support Services by installing, patching, upgrading, debugging and tuning operating system software. 3+ years' experience in system programming in DOS/VS1 and MVS environments with some data base knowledge and communications background preferred. **Ref. #8020**

Atlanta, New York City, Chicago, Los Angeles Opportunities

Software Support Representatives

Opportunities are available in the above field locations for software support professionals to be responsible for installing and providing customer support for VM-based systems. Positions require regional travel up to 50%, knowledge of VM, VM/SP externals/internals and BAL. A minimum of 2 years' operating system support experience required in a mainframe environment. System programming experience in a VM environment will be considered. BS in computer science or math preferred, but not necessary. **Ref. #8100N (NYC), #8200A (Atlanta), #8300C (Chicago), #8500W (Los Ang.)**

If you would like to make a contribution to our organization, please forward your resume, including salary history, and indicating reference number, to Elizabeth Lightbown, Nixdorf Computer Corporation, 168 Middlesex Turnpike, Burlington, MA 01803. An equal opportunity employer m/f.

NIXDORF COMPUTER

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- Communications/Networking upper $30s. Comten, VTAM, ACF/NCP.
- Analyst/Programmer to $29K. IMS/DL1, Inventory, order entry.
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POSITIONS AVAILABLE

Instr. or Asst. Prof in Quant. Methods/Comp. Sci., Fall 1984; 2 of 3 tenure track. Areas: telecommunications or comp. sci. plus 1 or 2 of: stats, DBMS, languages, digital electronics, op. systems, compiler/assembler construction, data structures, systems software, MIS, systems design. Qualifications: PhD or Master's with teaching exp. and/or substantial prof. exp.; competent to teach undergraduate level courses (stats, D.P., BASIC, FORTRAN, COBOL, PASCAL), adv. courses (DBMS, systems software), courses in the evening MBA program (stats & seminars) and the evening undergrad QM/CS degree and certificate programs. St. Thomas is a Catholic Liberal Arts College with an undergrad. day and evening division, an evening MBA program, and a Grad. Educ. program. Send resume by 2/15/84 to Dr. B. Folz, Chair, QM/CS Dept., College of St. Thomas, St. Paul, MN 55105.

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If you are interested and qualified for one of the following positions, write us soon.

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VMS—requires at least 2 or more years of application and/or system software experience. Experience with VAX/VMS software a plus.

RSX—requires at least 2 years' RSX-11M or RSX-11M-PLUS application and/or system experience.

CTS300/RT-11—requires at least 1 year's experience with applications and/or system experience.

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To apply, please send your resume to: Eva Martinez, Digital Equipment Corporation, Customer Support Center, Dept. 1030 3804, 4405 N. Chestnut Street, Colorado Springs, Colorado 80907.

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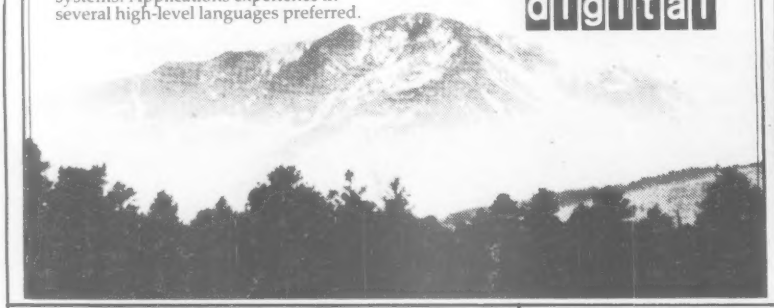

COMPUTER SYSTEMS ANALYST
COMPUTER SPECIALISTS
COMMUNICATIONS SPECIALIST

The U.S. General Accounting Office's Information Management and Technology Division has an immediate need for computer and communication specialists. The incumbents have varying duties and responsibilities in providing technical assistance on reviews of Federal agency automatic data processing, communications, and information resource management activities. The available positions are:

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COMPUTER HARDWARE/SOFTWARE SPECIALIST
A senior technical specialist with a broad knowledge of computer systems architecture, configuration management, and software design, development, and improvement. Demonstrated ability to evaluate the adequacy of hardware and/or software testing, and to use hardware and software evaluation tools and techniques such as program optimizers, analyzers and generators, language compilers and preprocessors.

COMPUTER/COMMUNICATIONS SYSTEM PERFORMANCE ANALYST
A senior technical specialist in the area of computer/communications system performance evaluation. Demonstrated ability to use a variety of data collection, analytical and simulation tools and techniques to evaluate computer/ communications system performance.

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A senior technical specialist in the areas of design, development, implementation, and management of voice and data communications systems. Demonstrated ability to use a variety of data collection and analytical tools to evaluate telecommunications systems performance, and the adequacy of operational voice and/or data communications systems.

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Min. 4 yrs. Operating Systems generation, maintenance and tuning with min. 2 yrs. VM.

SR. SYSTEMS PROGRAMMER to $40K
Min. 4 yrs. Systems generation with min. 2 yrs. MVS Performance monitoring & tuning.

SR. SYSTEMS PROGRAMMER to $40K
Min. 4 yrs. Software Support with min. 2 yrs. SNA, IBM 3705's, NCP, ACF/VTAM.

SR. SYSTEMS PROGRAMMER to $40K
Min. 2 yrs. Exp. in the generation, maintenance & tuning of RSX-11M+, DECNET a plus.

SR. SYSTEMS PROGRAMMER to $40K
Min. 3 yrs. IBM host based Distributed Systems with Min. 1 yr. in the generation, maintenance & tuning of DPPX Operating System.

APPLICATIONS

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Min. 2 yrs. exp. in the analysis and design of shared logic OFFICE AUTOMATION SYSTEMS. Exp. with IBM 8100's, DISPLAYWRITER, P.C.'s, Electronic Mail and/or Communications are a plus.

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Min. 4 yrs. exp. in the analysis & design of data processing systems with project involvement, user interface, analytical ability & verbal & written communications skills. Capability of understanding, evaluating & solving equipment problems in the OFFICE AUTOMATION AREA.

ANALYST/PROGRAMMER to $36K
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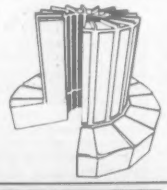

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Statewide Office of Human
Resource Development
Room 1
Bunnell Building
University of Alaska
303 Tanana Drive
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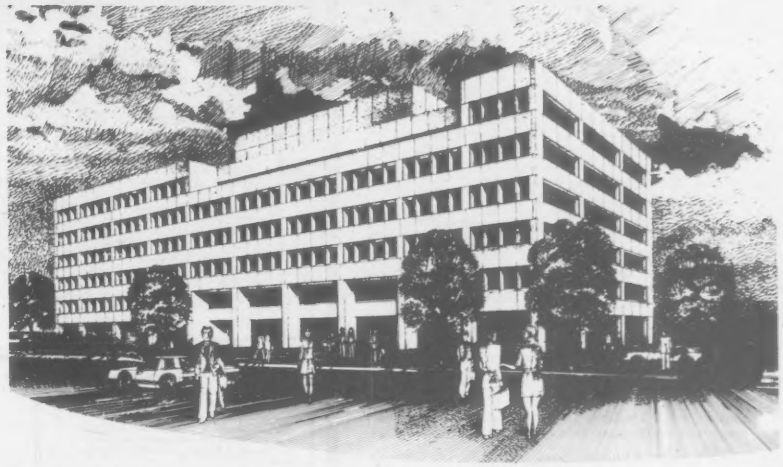

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You will perform test planning, conduct integration and test at subsystem and system levels, and support installation. Previous experience testing large complex systems preferred. IBM or DEC/VAX experience desired. Ray Price, (703) 876-8170.

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MR. RON CHEEK
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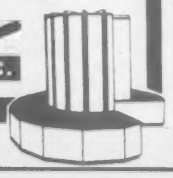

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Individuals meeting these requirements should send a resume and salary requirements to: **Bob Duarte.**

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A Project Manager and several Systems Analysts are needed to design, develop and implement a CAD/CAM database management system. This system will provide a central repository for all CAD/CAM data needed during the project life cycle. It will replace the storage and management functions of individual data repositories. Experience in the design and development of a large scale DBMS in an IBM environment is required. CAD/CAM experience is a definite plus. An advanced degree in Computer Science or a related field is preferred.

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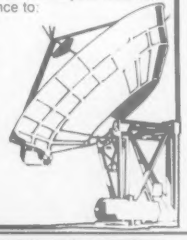

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COMPUTER SCIENCE FACULTY POSITION

The Pennsylvania State University in Erie. Continuing position starting Fall, 1984. Tenure track if appointment is made at Assistant Professor level or higher. Duties include teaching and participation in research. Prefer Ph.D. in Computer Science or Ph.D. in related area with Masters degree in Computer Science. Will consider candidates with Masters degree and industrial or teaching experience. Rank dependent on qualifications. Salary and benefits competitive.

A detailed resume, three letters of reference and official transcripts should be sent to Dr. R.E. Larson, Acting Head, Division of Science, Engineering and Technology, The Pennsylvania State University, Erie, PA 16563. Application deadline is January 31, 1984 or until a suitable applicant is identified. An equal opportunity/affirmative action employer.

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Nebraska Wesleyan University seeks an Assistant Director of Computer Services. Work is primarily with administrative offices to provide data processing support; some work will be with computer science and related instruction. DEC RSTS/E, BASIC-PLUS, and POISE experience desirable. Bachelor's degree required; Master's preferred. Salary commensurate with experience and qualifications. Send letter of application, resume and three letters of reference by November 30, 1983, to:

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The joint Center for Graduate Study in Richland, Washington wishes to fill a tenure track faculty position of Program Coordinator in Computer Science. The level of this appointment will be at either the Associate or Full Professor rank. The Center is administered jointly by the University of Washington and Washington State University. Programs offered at the Center are mainly in science and engineering and are oriented to serve local working professionals. The graduate and undergraduate programs in Computer Science are sponsored by the Computer Science Department of Washington State University.

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Candidates must hold a Ph.D. in Computer Science or a related field and should have knowledge and experience in a core area. Application, including three (3) letters of recommendation and a current curriculum vitae, should be addressed to Chairman, Computer Science Screening Committee, Joint Center for Graduate Study, 100 Sprout Road, Richland, WA. 99352. Evaluation of applications will begin on November 30, 1983. The Joint Center for Graduate Study/Washington State University is an Equal Opportunity/Affirmative Action employer.

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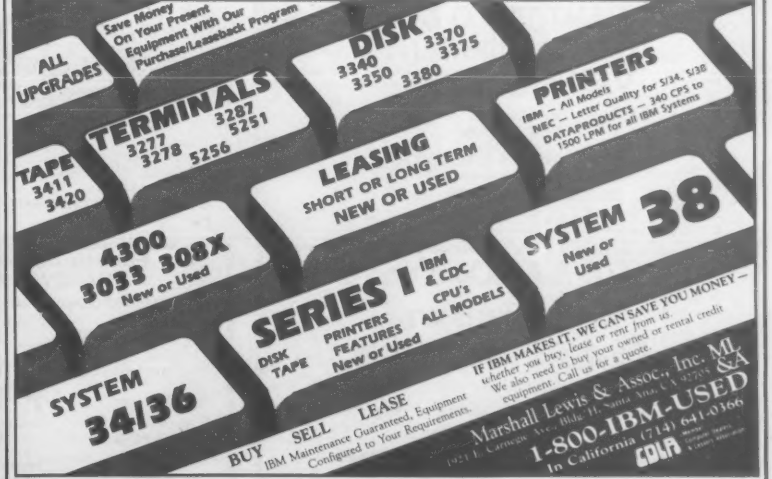

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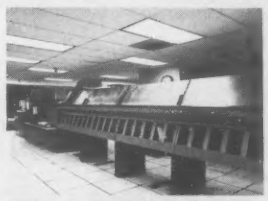

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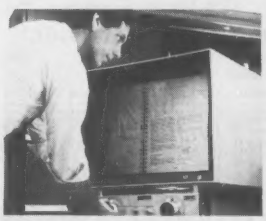

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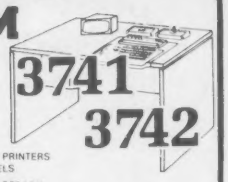

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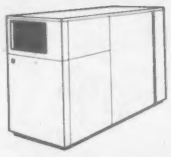

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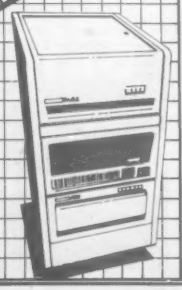

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An Intergovernmental Electronic Mail Network. Proposals Due: Monday, December 12,1983 at 2:00 P.M. Proposal No. B46-400-8739. Sealed proposals will be received at the office of the Director of Purchasing, 2505 S.E. 11th Avenue, Portland, Oregon for: Multnomah County, representing itself, several other local public agencies, and the State of Oregon is requesting proposal for hardware and/or software for the pilot phase of an intergovernmental electronic mail system. The product(s) offered will include or imply a network architecture which should be explained in detail. It is assumed that any centralized operation and support would be located at the Multnomah County Data Processing Authority facility as per specifications on file with the Purchasing Director. No proposal will be received or considered unless the proposal contains a statement by the bidder as part of his bid that the requirements of ORS 279.350 shall be included. Multnomah County reserves the right to reject any or all proposals.
PRE-BID CONFERENCE will be held November 16, 1983, at 10:00 A.M. Pacific Standard Time. This conference is optional and vendors must notify Multnomah County Purchasing if they plan to attend.
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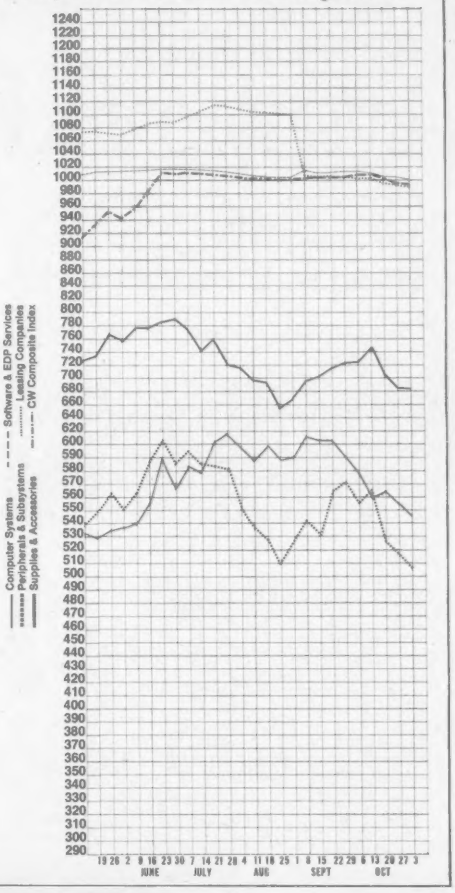

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N	AT&T	60- 70	61 7/8	+1 1/2	+2.4
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U	COMPUTER AUTOMATION	6- 17	6	- 3/4	-11.1
A	COMPUTER CONSOLES	8- 26	18 3/8	+ 1/4	+1.3
N	CONTROL DATA CORP	21- 62	48 3/4	+3 5/8	+8.0
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N	FOXBORO	22- 47	29 7/8	-2 7/8	-8.7
O	GENERAL AUTOMATION	3- 16	9 3/8	- 1/2	-5.0
N	GOULD INC	26- 44	28 1/4	- 3/4	-2.8
N	HARRIS CORP	20- 51	34 3/4	-1 3/8	-3.8
N	HEWLETT-PACKARD CO	22- 49	37	+1 1/4	+3.4
N	HONEYWELL INC	80-132	126 5/8	- 3/8	-0.2
N	IBM	57-134	126 1/2	-1 1/2	-1.1
O	IPL SYSTEMS INC	3- 14	5 3/4	+ 1/2	+9.5
N	M/A-COM INC	21- 35	23 5/8	+2 3/4	+13.1
O	MAGNUSON COMP SYSTS	2- 5	3/8	- 1/4	-40.0
N	MANAGEMENT ASSIST	7- 18	15 7/8	+2 3/8	+17.5
N	MATSUSHITA ELEC(ADR)	47- 77	73 1/4	+1 1/2	+2.0
N	MODULAR COMPUTER SYS	8- 16	7 3/4	- 3/4	-8.8
N	MOHAWK DATA SCI	10- 19	13 1/8	- 1/2	-3.6
N	MOTOROLA INC	82-148	132 3/4	-10 1/4	-7.1
N	NAT'L SEMICONDUCTOR	22- 60	53 1/4	+ 1/8	+0.2
N	NCR	38-135	129 3/4	+5 7/8	+4.7
N	PERKIN-ELMER	17- 37	27 3/4	-5 1/8	-15.5
N	PRIME COMPUTER INC	11- 30	14 5/8	+ 7/8	+6.3
N	SPERRY CORP	21- 47	43 3/4	+1 1/4	+2.9
O	TANDEM COMPUTERS INC	14- 38	33	-1 1/2	-4.3
N	TANDY CORP	35- 65	39 3/8	+3 3/4	+10.5
O	TELEVIDEO SYSTEMS	14- 41	16 1/4	+ 1/8	+0.7
N	TEXAS INSTRUMENTS	71-176	128 1/2	+20	+18.4
O	VECTOR GRAPHICS INC	2- 14	2	- 5/8	-23.8
A	WANG LABS "B"	13- 42	33 3/4	+2 5/8	+8.4
A	WANG LABS "C"	11- 42	33 5/8	+3 1/8	+10.2
N	XEROX CORP	35- 50	46 3/8	+ 1/2	+1.0

LEASING COMPANIES

O	BOOTHE FINANCIAL CP	11- 33	28 3/4	-1 1/2	-4.7
N	COMDISCO INC	7- 42	18 5/8	-4 3/8	-18.2
O	CONTINENTAL INFO SYS	3- 18	8	-1	-10.0
N	DPF INC	9- 15	13 7/8	+ 7/8	+6.7
N	U.S. LEASING	18- 47	38 1/4	- 1/8	-0.3

COMPONENTS

N	ADVANCED MICRO DEV	13- 35	30 1/4	- 1/4	-0.8
O	ADV'D SEMICONDUCTOR	12- 34	28 1/4	-1	-3.4
N	ANALOG DEVICES INC	18- 42	38	+ 3/8	+1.0
O	ANALOGIC CORP	20- 27	22	0	0.0
N	APPLIED MAGNETICS CP	18- 37	26 3/8	-1 3/8	-4.8
N	TERADYNE	14- 38	32 1/4	+2 3/4	+9.3

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

E X C H		1982-83 RANGE (1)	CLOSE NOV 2 1983	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 8	3 1/4	+ 1/4	+8.3
O	ADVANCED SYSTEMS INC	6- 22	17 3/4	0	0.0
O	AGS COMPUTERS INC	7- 32	24	-1 1/4	-4.9
O	AMERICAN SOFTWARE	21- 31	21 1/2	-3	-12.2
N	ANACOMP INC	7- 23	6 7/8	-1 1/8	-14.0
O	ANALYSTS INTL CORP	5- 20	15	+ 1/4	+1.6
A	APPLIED DATA RES.	9- 37	30 1/2	-1 1/2	-4.6
O	ASK COMPUTER SYSTEMS	6- 21	17 3/4	-1 1/4	-6.5
B	ASTRADYNE COMP IND	1- 7	3	0	0.0
N	AUTOMATIC DATA PROC	21- 44	35 1/8	-2	-5.3
O	CGA COMPUTER ASSOC	5- 17	13 5/8	+ 1/4	+1.8
O	COMPUTER ASSOC INT'L	6- 35	26	+ 3/4	+2.9
O	COMPUTER HORIZONS	8- 20	10 1/4	- 1/4	-2.3
O	COMPUTER NETWORK	4- 10	6 1/8	0	0.0
N	COMPUTER SCIENCES	11- 23	16 1/2	- 7/8	-5.0
O	COMPUTER TASK GROUP	9- 22	13 3/4	0	0.0
O	COMPUTER USAGE	2- 22	14 1/4	- 1/2	-3.3
O	COMPUTONE SYSTEMS	6- 38	8 1/4	- 1/2	-7.4
O	CONSERV CORP	6- 20	6	- 7/8	-12.7
O	COMSHARE	7- 13	9 1/2	- 1/8	-1.2
N	CULLINET SOFTWARE	12- 50	36 5/8	-3 5/8	-9.0
O	CYCARE SYSTEMS INC	9- 27	19	+1	+5.5
N	ELECTRONIC DATA SYST	10- 42	34 3/4	-2 1/4	-6.0
O	HOGAN SYSTEM INC	27- 53	41	-1	-2.3
N	GENERAL ELECTRIC CO	45- 58	52 3/8	+ 3/8	+0.7
N	GTE CORP	39- 48	46 7/8	+1	+2.1
N	INFORMATICS INC	10- 34	22 1/8	- 3/8	-1.6
O	INFOTRON SYSTEMS COR	25- 43	31 1/2	-1 1/4	-3.8
O	KEANE ASSOCIATES	4- 15	7 1/4	- 1/4	-3.3
A	LOGICON	8- 30	29 1/4	+ 7/8	+3.0
O	MCI COMMUNICATIONS	13- 34	14 3/8	+ 3/4	+5.5
O	MAGIC SCI AMER INC	8- 33	26 1/4	+ 1/4	+0.9
O	MATHEMATICAL APP GRP	12- 22	13	-1	-7.1
O	MICOM SYSTEMS INC	25- 50	41 1/4	+1	+2.4
O	MONCHIK-WEBER CP	9- 22	9 1/4	-1 1/2	-13.9
O	NATIONAL DATA CORP	5- 26	18 7/8	- 3/8	-1.9
O	ON-LINE SOFTWARE INT	17- 27	17	0	0.0
O	PANSOPHIC SYSTEMS	8- 30	20	-1 1/8	-5.3
N	PLANNING RESEARCH	6- 21	18 7/8	- 3/8	-2.1
O	POLICY MGMT SYSTS CP	15- 35	27	- 1/4	-0.9
O	PROGRAMMING & SYS	1- 8	5 1/4	- 1/4	-4.5
O	REYNOLDS & REYNOLD	17- 53	51	- 1/2	-1.1
O	SEI CORP	11- 34	26 3/4	+ 3/4	+2.8
O	SHARED MEDICAL SYST	13- 43	30 1/2	-1 1/8	-3.5
O	SCIENTIFIC COMPUTERS	6- 14	10 1/2	- 1/4	-2.3
O	SOFTWARE AG	5- 17	9 5/8	0	0.0
N	TYMSHARE INC	12- 30	22 3/8	+1 1/8	+5.2
A	URS CORP	5- 18	12 7/8	+ 1/4	+1.9
N	WYLY CORP	7- 17	9 7/8	-1	-9.1

PERIPHERALS & SUBSYSTEMS

P	AM INTERNATIONAL	2- 7	4 3/8	+ 1/4	+6.0
A	ANDERSON JACOBSON	8- 26	9 1/2	- 1/8	-1.2
O	AUTO-TROL TECHNOLOGY	8- 28	17 3/4	+ 3/4	+4.4
O	BANCTEC INC	7- 33	14 3/4	+1	+8.3
A	BEEHIVE INT'L	4- 15	7 3/8	- 5/8	-7.8
A	BOLT,BERANEK & NEW	9- 60	42 1/2	-3 3/4	-8.1
O	CAMBEX CORP	2- 4	2	- 1/8	-5.8
N	CENTRONICS DATA COMP	6- 28	17 1/8	+ 3/8	+2.2
A	CETEC CORP	4- 12	8 3/4	-1 3/8	-13.5
O	COGNITRONICS	2- 20	8 1/2	+1	+13.3
O	COMPUTER DEVICES INC	1- 21	1	-3	-75.0
O	COMPUTER TRANSCEIVER	4- 12	4 3/4	- 1/4	-5.0
N	COMPUTERVISION CORP	19- 53	41 5/8	+2 1/2	+6.3
N	COMRAC CORP	17- 38	17 1/2	+ 3/4	+4.4
A	DATAPRODUCTS CORP	18- 41	28 3/4	0	0.0
A	DATARAM CORP	5- 12	11 1/8	+ 1/4	+2.2
O	DATA SWITCH CORP	13- 41	28	0	0.0
O	DATUM INC	2- 17	9 5/8	- 1/8	-1.2
O	DECISION DATA COMPUT	3- 16	10 3/4	+ 3/8	+3.6
O	DOCUTEL-OLIVETTI	13- 39	13 1/4	- 1/8	-0.9
N	ELECTRONIC M & M	5- 11	7 1/8	- 1/2	-6.5
O	EVANS & SUTHERLAND	18- 50	36 3/4	-3 1/2	-9.1
O	GANDALF TECHNOLOGIES	8- 22	9	0	0.0
N	GEN'L AUTOMATION IND	6- 29	25 3/8	-1 7/8	-6.8
O	GREAT SOUTHWEST IND	2- 6	1 1/2	0	0.0
N	HAZELTINE CORP	7- 31	20 3/4	- 3/4	-3.4
O	ICOT CORP	3- 10	3 3/8	- 3/4	-18.1
O	INFORMATION INTL INC	10- 22	13 1/2	0	0.0
O	INTEL CORP	11- 45	37	-1 1/2	-3.9
O	IPL SYSTEMS INC	5- 14	5 3/4	+ 1/2	+8.5
A	LUNDY ELECTRONICS	7- 19	11 1/4	- 3/8	-3.2
O	MEGADATA CORP	9- 15	11 1/4	+ 1/8	+1.1
A	MSI DATA CORP	18- 37	19 7/8	+1	+5.2
N	NASHUA CORP	9- 29	22 3/8	-2	-8.2
O	NETWORK SYSTEMS CORP	8- 34	21 1/4	+ 1/8	+0.5
N	NO AMERICAN PHILIPS	47- 74	73 3/4	+ 3/4	+1.0
N	NORTHERN TELECOM LTD	22- 49	41 1/2	+1 3/8	+3.4
O	OMEX	3- 6	6	0	0.0
N	PARADYNE CORP	14- 30	15 1/2	+1 1/4	+8.7
A	PENRIL CORP	7- 14	10 7/8	+ 3/4	+7.4
O	PHOENIX AMERICAN INC	7- 17	10 1/8	- 5/8	-5.8
N	PLESSEY CO (ADR)	26- 41	30	+ 1/2	+1.6
O	PRINTRONIX INC	23- 34	24 1/2	-1	-3.9
O	RAMTEK CORP	9- 26	9	-3	-25.0
N	RAYTHEON CO	42- 58	45 1/2	+1 1/8	+2.5
N	RECOGNITION EQUIP	4- 17	14 3/4	- 1/2	-3.2
N	ROLM CORP	40- 80	55 7/8	+2 3/8	+4.4
N	SANDERS ASSOCIATES	52-120	57 1/4	+4 1/2	+8.5
O	SCAN DATA	1- 3	2	0	0.0
O	SCAN-TRON CORP	12- 18	13 1/2	0	0.0
N	SCIENTIFIC ATLANTA	15- 23	14 3/4	- 5/8	-4.0
N	STORAGE TECHNOLOGY	15- 33	16 1/2	+1 3/8	+9.0
O	SYKES DATATRONICS	5- 27	5 3/8	+ 7/8	+19.4
O	SYSTEMS & COMP TECH	27- 38	28 1/4	+1 1/4	+4.2
A	T BAR INC	7- 17	8 5/8	- 5/8	-6.7
A	TAB PRODUCTS CO	8- 30	20 7/8	0	0.0
O	TANDON CORP	19- 38	20 3/4	-1 3/4	-7.7
A	TEC INC	8- 12	8 5/8	-1	-13.1
N	TEKTRONIX INC	34- 87	76 3/4	-2 1/2	-3.1
N	TELEX	5- 32	23 5/8	- 1/2	-2.0
O	TESDATA SYSTEMS CP	3- 17	8 1/4	- 1/4	-2.6
N	TIMEPLEX INC	7- 29	22 1/4	+ 7/8	+4.0
O	VISUAL TECHNOLOGY	9- 26	18 1/2	0	0.0

SUPPLIES & ACCESSORIES

N	AMERICAN BUS PRODS	11- 34	29 5/8	-1 3/8	-4.4
N	BARRY WRIGHT	13- 32	31 3/4	- 1/2	-1.5
A	DUPLEX PRODUCTS INC	12- 28	24 1/2	- 3/4	-2.9
N	ENNIS BUS. FORMS	6- 28	25 3/8	- 3/4	-2.8
N	3M COMPANY	48- 90	84 3/4	- 1/2	-0.5
N	MOORE CORP LTD	26- 51	43 1/8	+ 3/8	+0.8
O	STANDARD REGISTER	11- 34	30 1/2	- 1/2	-1.6
N	WALLACE BUS FORMS	11- 31	30	0	0.0

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